

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

YUZHAO JIN,

Plaintiff,

v.

THE PARTNERSHIPS and UNINCORPORATED
ASSOCIATIONS IDENTIFIED ON SCHEDULE "A"

Defendants.

Case no. 1:24-CV-5247

DECLARATION OF FEI LI

I, Fei Li, declare as follows:

1. I am the owner of Hangzhou Hengbo Trading Co., Ltd ("Hangzhou") and make this statement based on my personal knowledge.
2. Hangzhou is the distributor of foldable baby's bathtubs to retailers who sell the products online through Amazon.
3. On June 27, 2024, David Chen, who is responsible for the manufacturer of the bathtubs Hangzhou distributes, received WeChat communications indicating that Plaintiff had commenced legal proceedings for patent infringement in the Northern District of Illinois against the sellers of bathtubs. David shared the communications with me, true and correct copies of which are attached as **Exhibit 1**. This **Exhibit 1** also includes English translations of these communications, which I can attest are accurate to the best of my ability. The white boxes are the

messages from the Plaintiff's representative and the green boxes are messages from David. Neither myself nor Hangzhou is in any confidential relationship with Plaintiff nor did Plaintiff require myself or Hangzhou to agree to keep the communications regarding the filing of this lawsuit confidential.

4. David and I understood these communications from Plaintiff to put us on notice that Hangzhou and/or the Amazon retailers of Hangzhou's bathtubs were defendants in the lawsuit. I immediately notified Hangzhou's attorneys at Karr Tuttle Campbell in Seattle, WA of the lawsuit. Unfortunately, the attorneys were unable to confirm whether or not Hangzhou or its retailers had actually been named in the complaint because the list of defendants is sealed.

5. Regardless of whether Hangzhou itself is named or its Amazon retailers are named, Hangzhou will be harmed if a temporary restraining order is entered. Plaintiff will use it to cause Amazon to disable the retailers' Amazon store pages and freeze their account. This will cause Hangzhou to lose sales and revenue at the worst possible time for businesses dependent on sales through Amazon. That is because Amazon Prime Day is right around the corner on July 16th and 17th.

6. If given an opportunity to defend itself, I am confident Hangzhou will be able to establish that the Plaintiff's patent is invalid and unenforceable. Indeed, attached as **Exhibits A-C** are true and correct copies of patents that I found in the short time I had to investigate before the hearing on July 3, 2024, which establish that Plaintiff's patent was unambiguously anticipated and/or rendered obvious by prior art available to the public before Plaintiffs' patent's priority date of October 10, 2022. I hope to have that opportunity and the company looks forward to vigorously defending itself.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

EXECUTED this 2nd day of July, 2024 in Hangzhou, Zhejiang, China

Fei Li
Fei Li

CERTIFICATE OF SERVICE

On this day, I caused a true and correct copy of the foregoing document to be filed with the Court electronically. I caused the same to be served on the parties listed below via the Court's CM/ECF system.

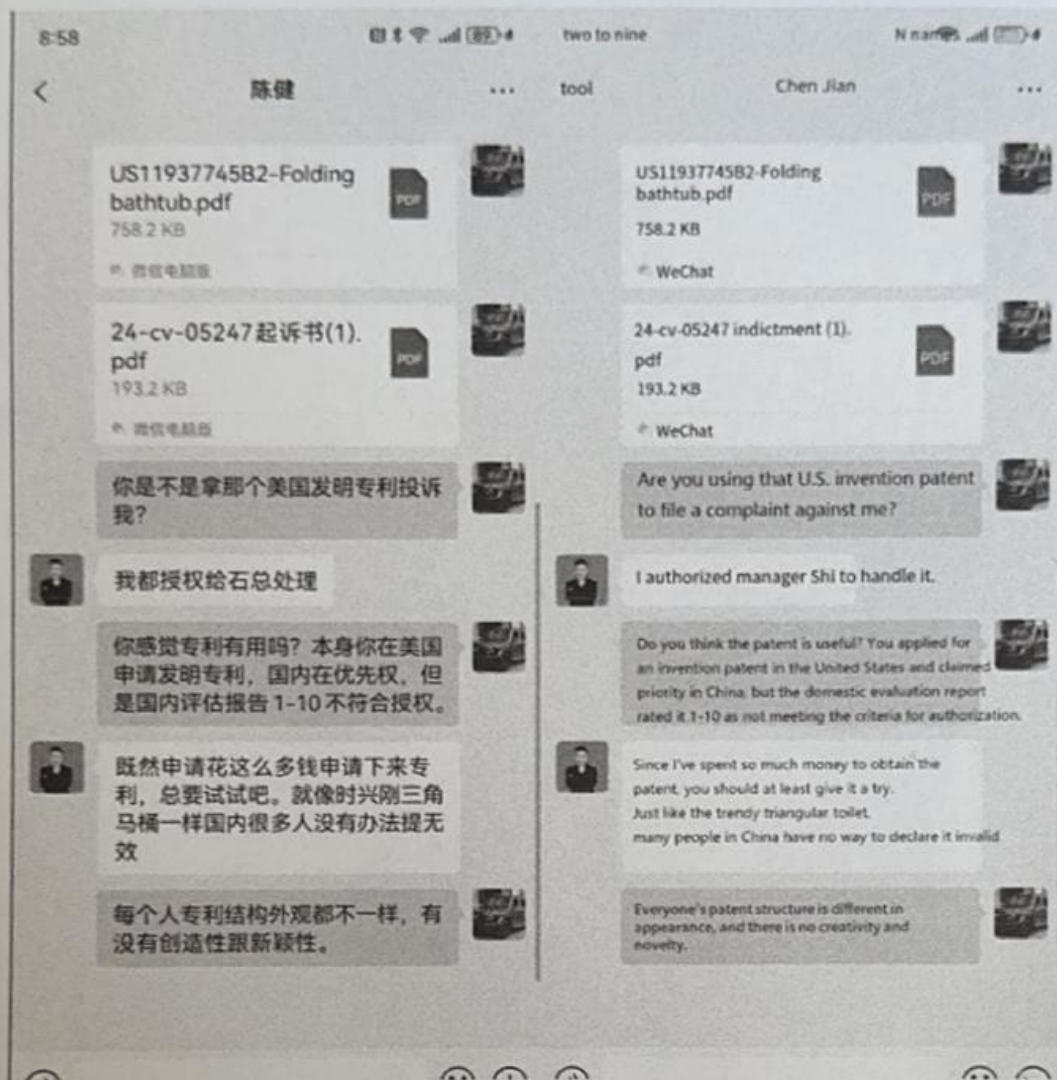
Hao Ni
Texas Bar No. 24047205
hni@nilawfirm.com
Stevenson Moore
Texas Bar No. 24076573
Smooore@nilawfirm.com

NI, WANG & MASSAND, PLLC
8140 Walnut Hill Ln., Ste. 615
Dallas, TX 75231
Tel: (972) 331-4600
Fax: (972) 314-0900

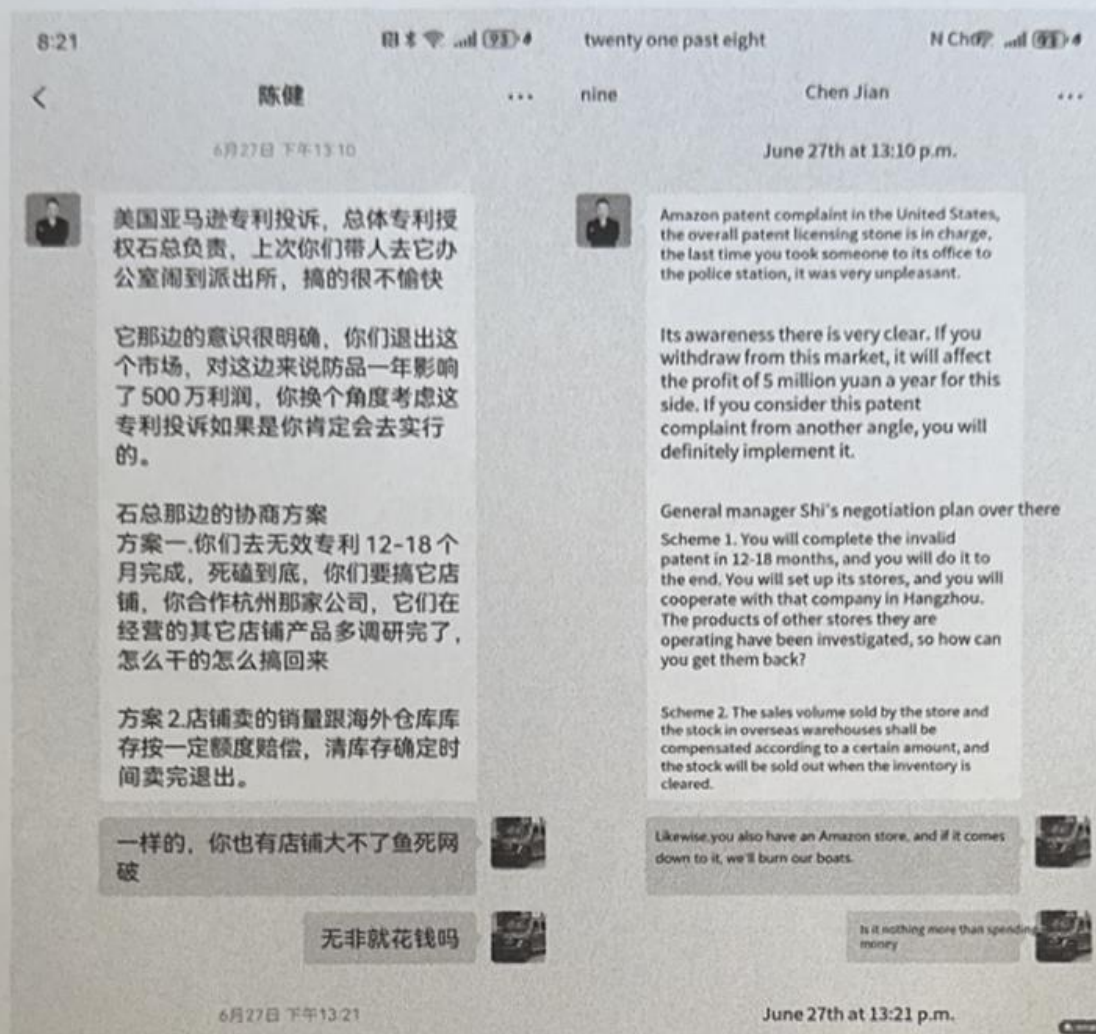
Counsel for Plaintiff

Dated this 2nd day of July, 2024.

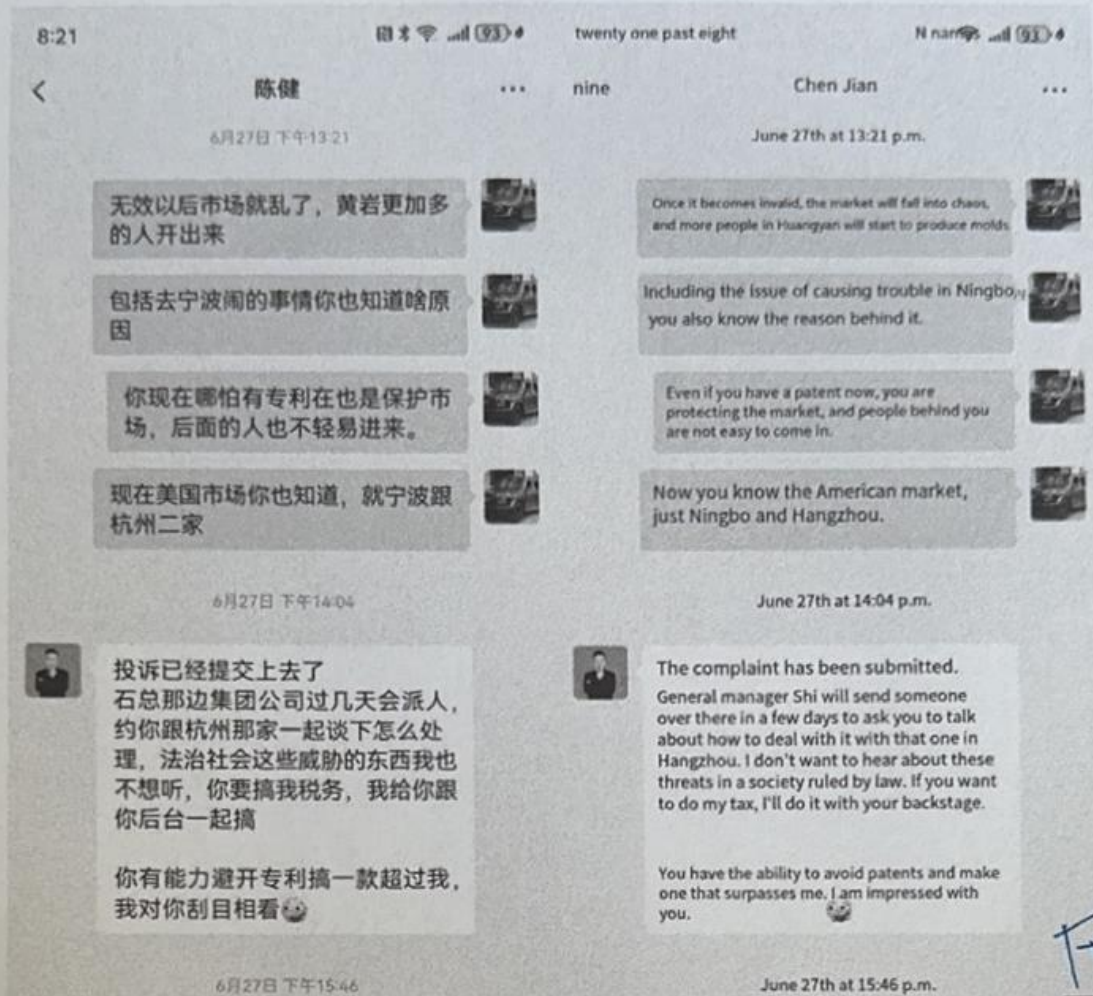
s/ Fei Li

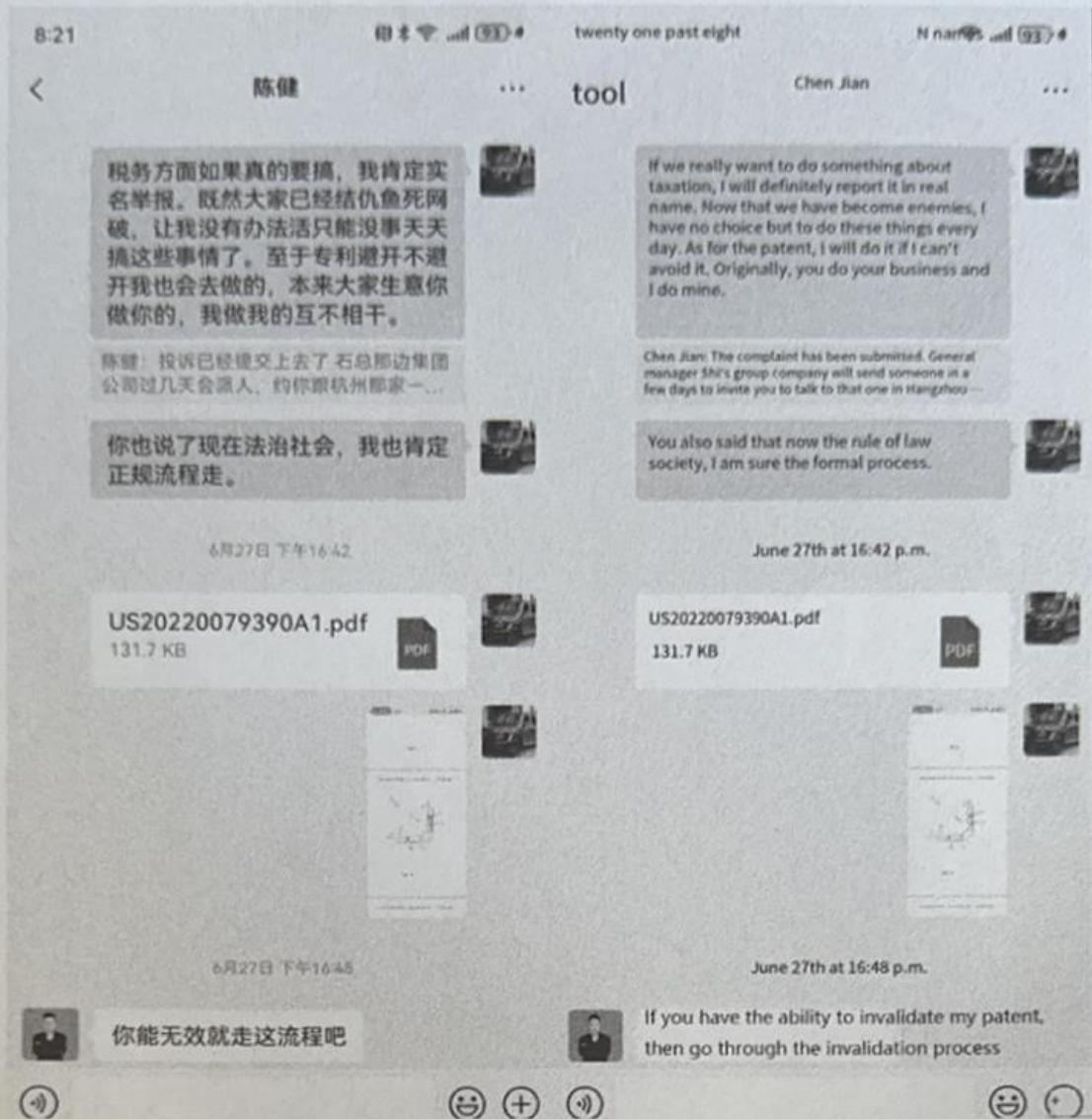


Fei Li

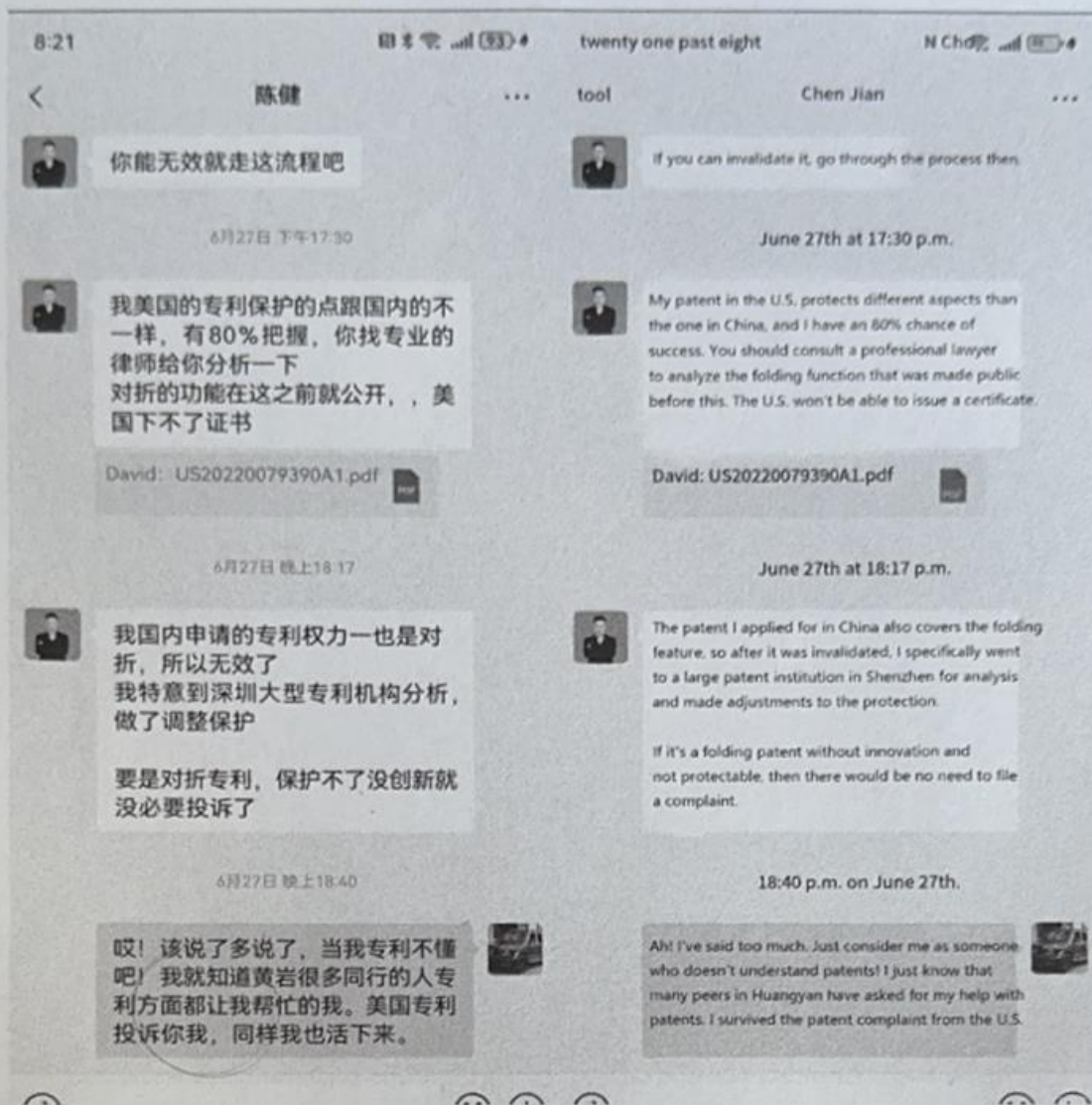


Fei Li

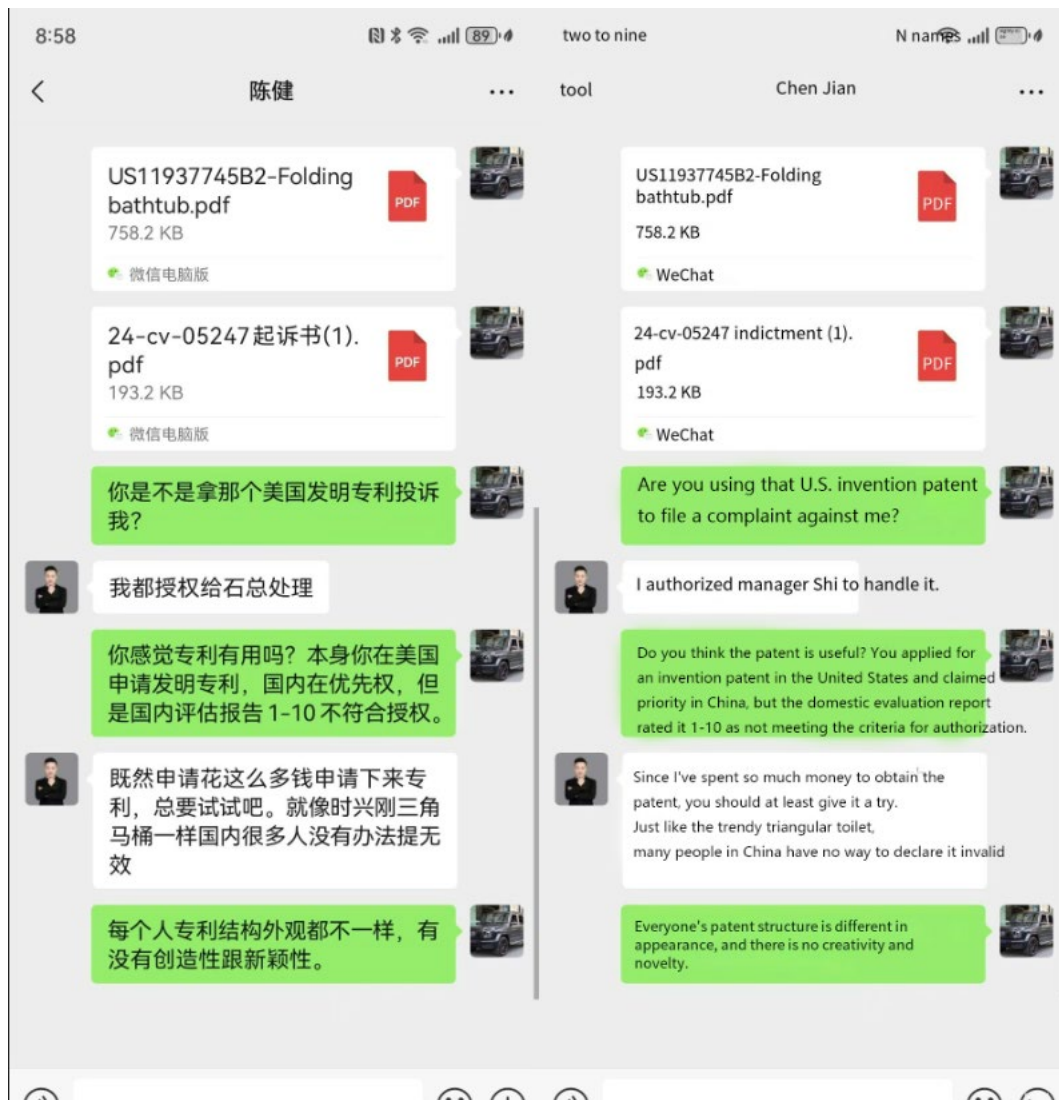


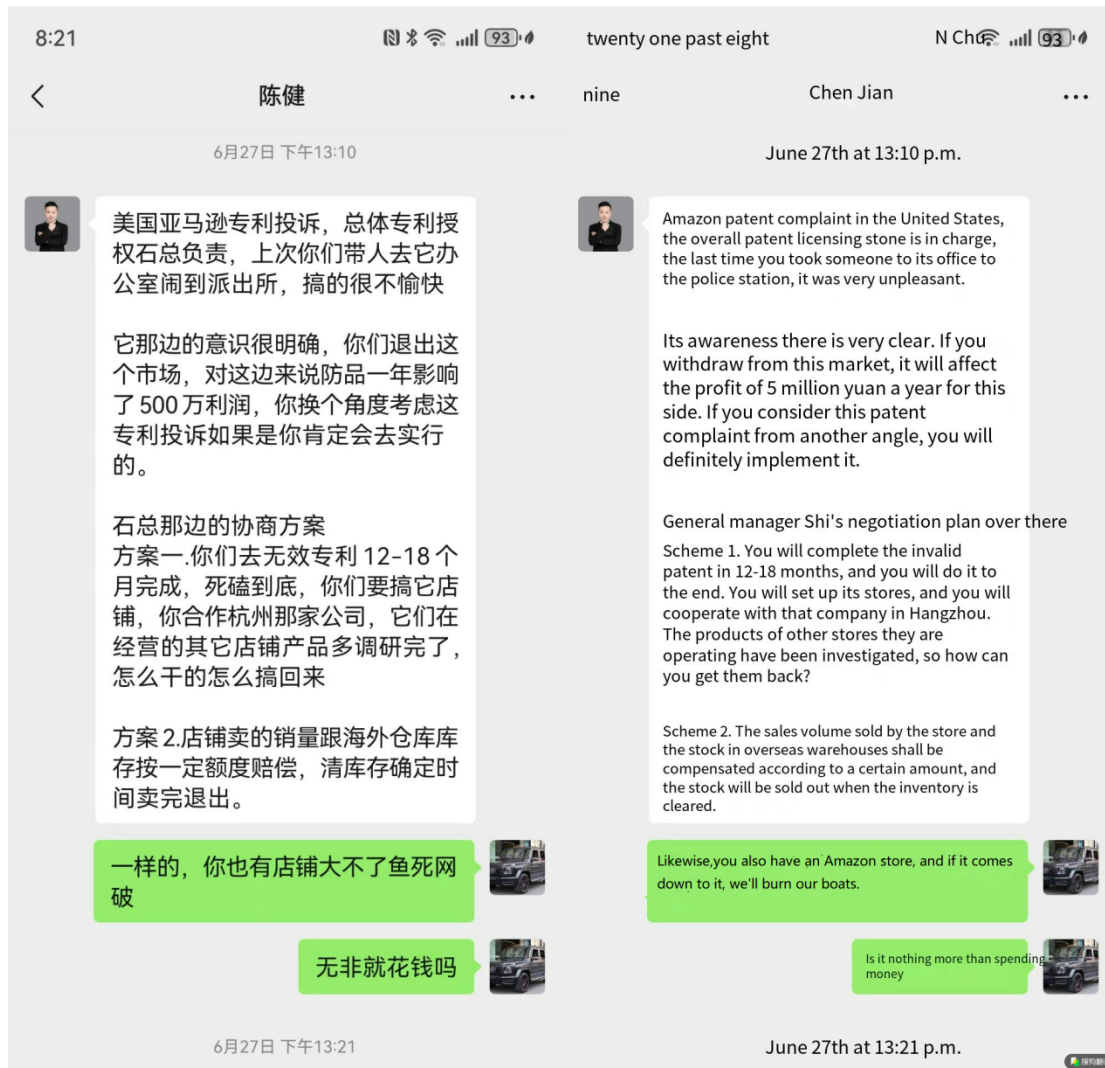


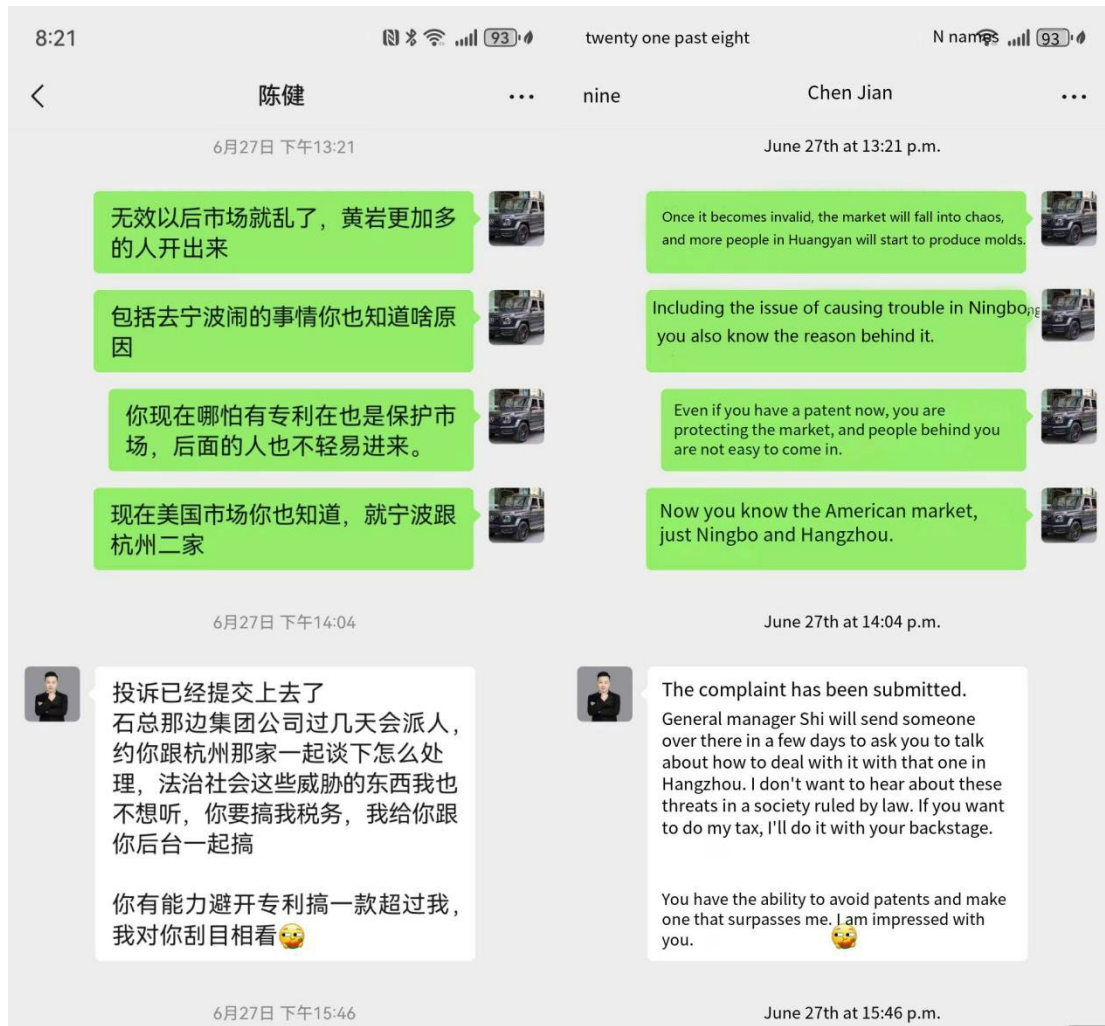
Fei Li

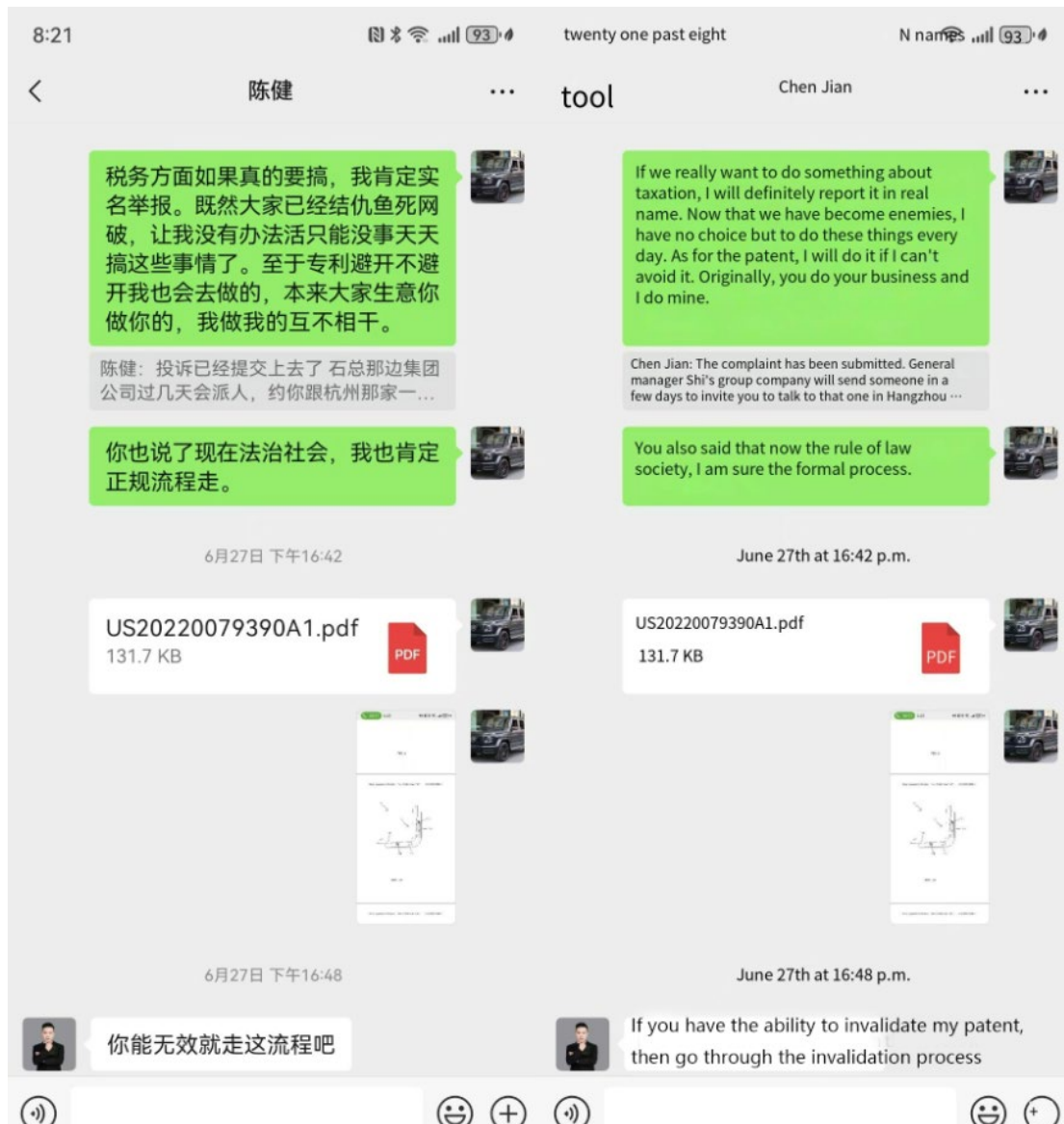


Fei Li









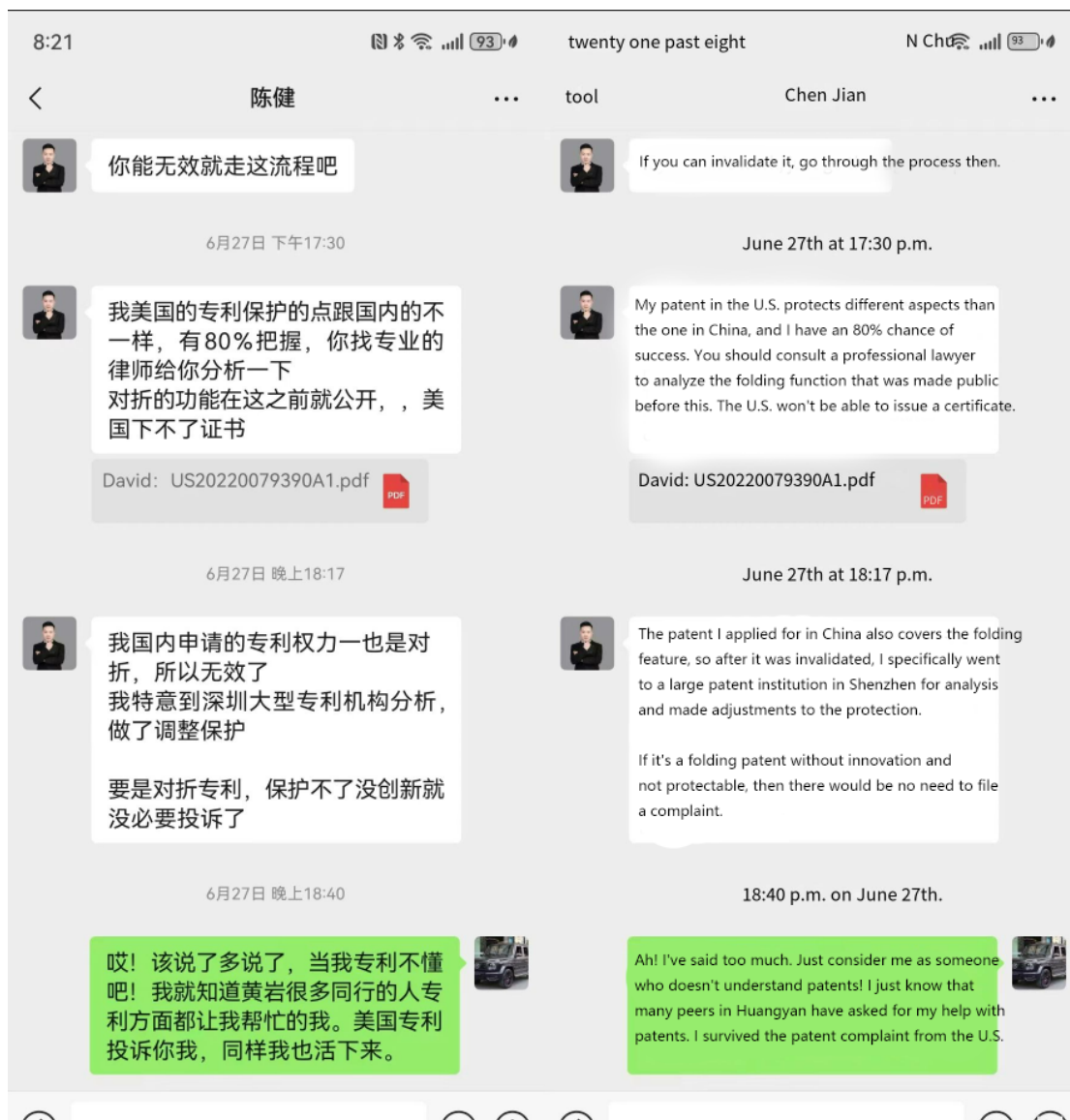


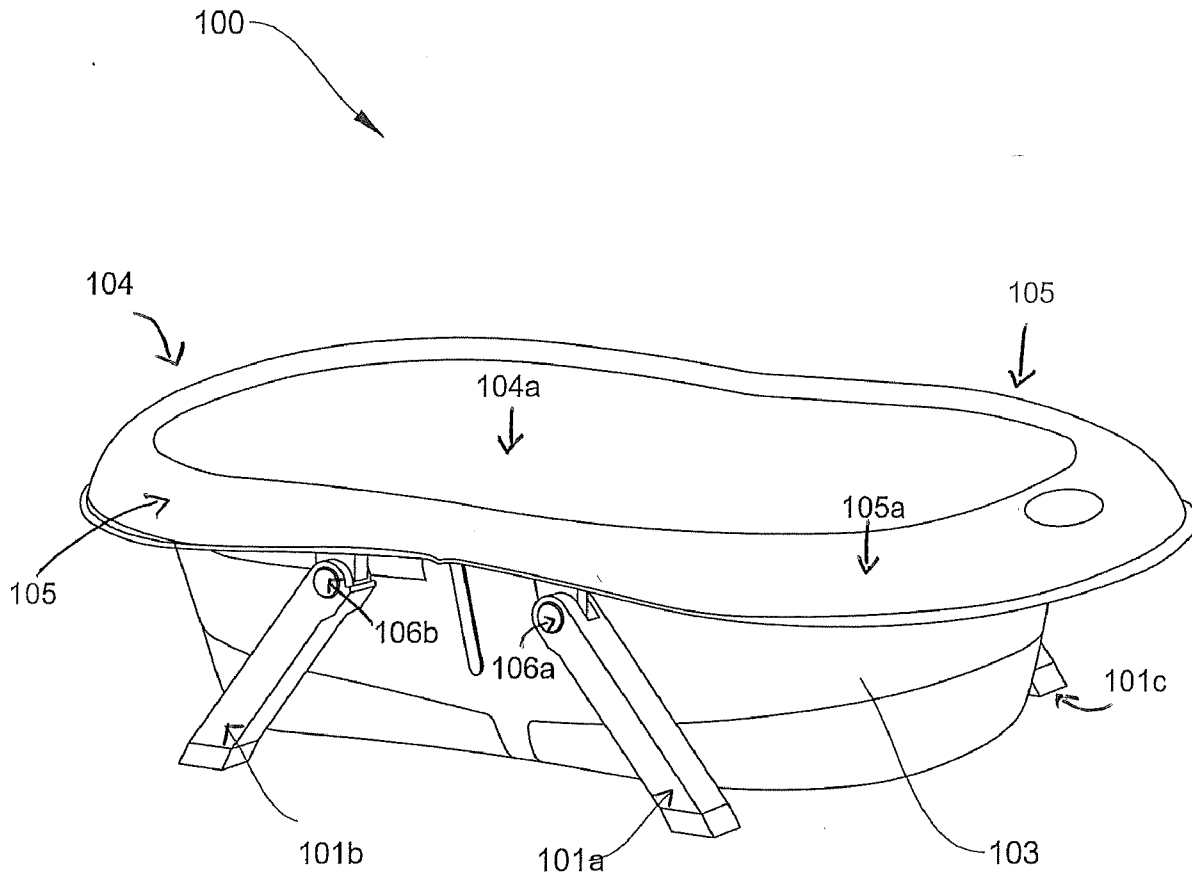
EXHIBIT A



US 20220079390A1

(19) **United States**(12) **Patent Application Publication**
Pruzhansky et al.(10) **Pub. No.: US 2022/0079390 A1**(43) **Pub. Date: Mar. 17, 2022**(54) **PORTABLE, FOLDABLE, COLLAPSIBLE
BATHTUB****Publication Classification**(51) **Int. Cl.***A47K 3/06* (2006.01)*A47K 3/024* (2006.01)(52) **U.S. Cl.**CPC *A47K 3/06* (2013.01); *A47K 3/024*
(2013.01)(71) Applicant: **Baby Brielle, Inc.**, Brooklyn, NY (US)(72) Inventors: **Igor Pruzhansky**, Brooklyn, NY (US);
Lihong Jiang, Taizhou City (CN)(73) Assignee: **Baby Brielle, Inc.**, Brooklyn, NY (US)(21) Appl. No.: **17/020,591**(22) Filed: **Sep. 14, 2020**

(57)

ABSTRACTA portable, foldable, collapsible bathtub for infants or
younger children that can collapse allowing for easy storage.

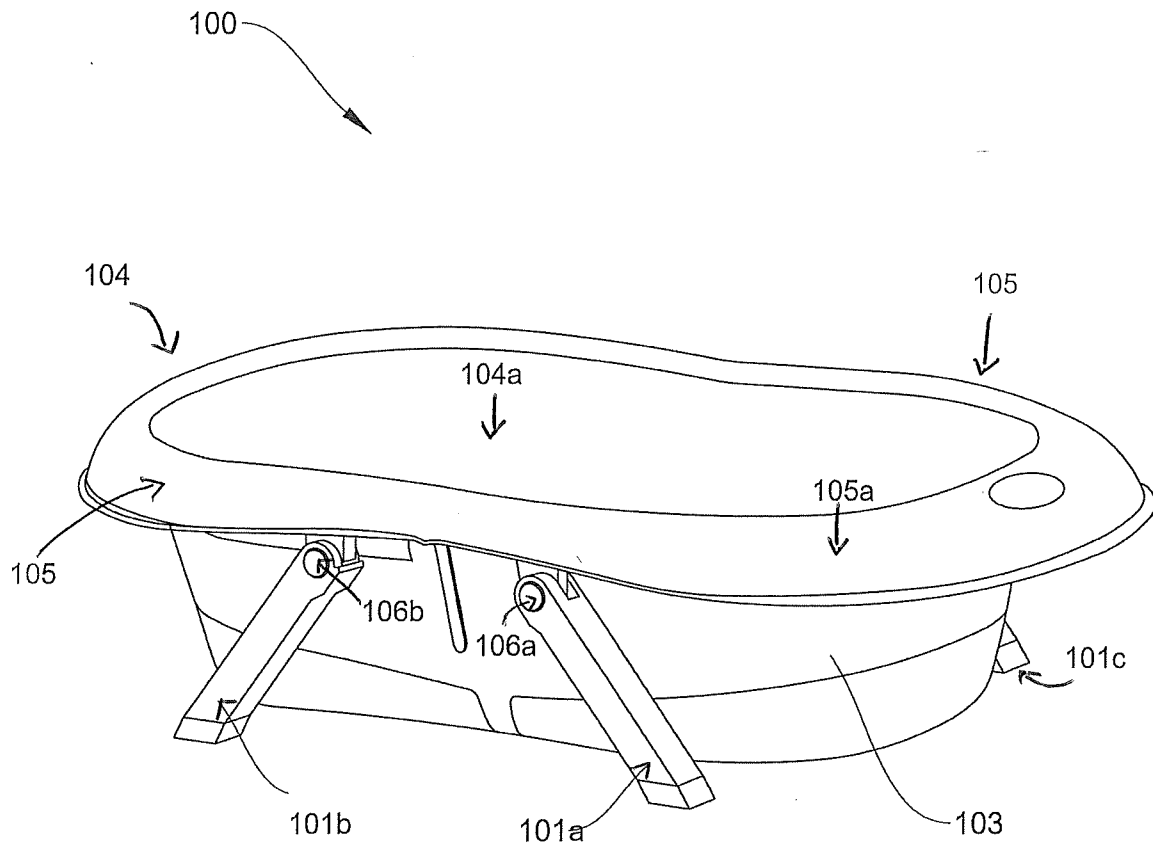


FIG. 1

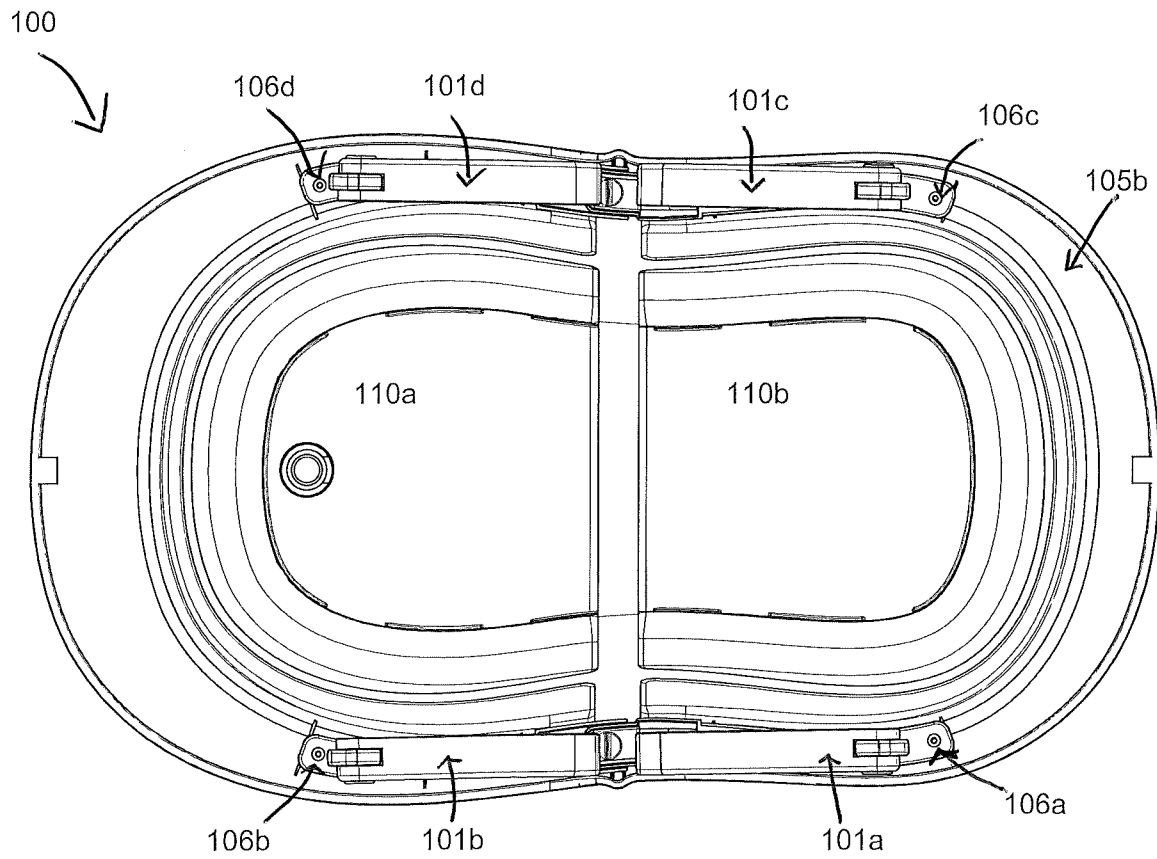


Fig. 2

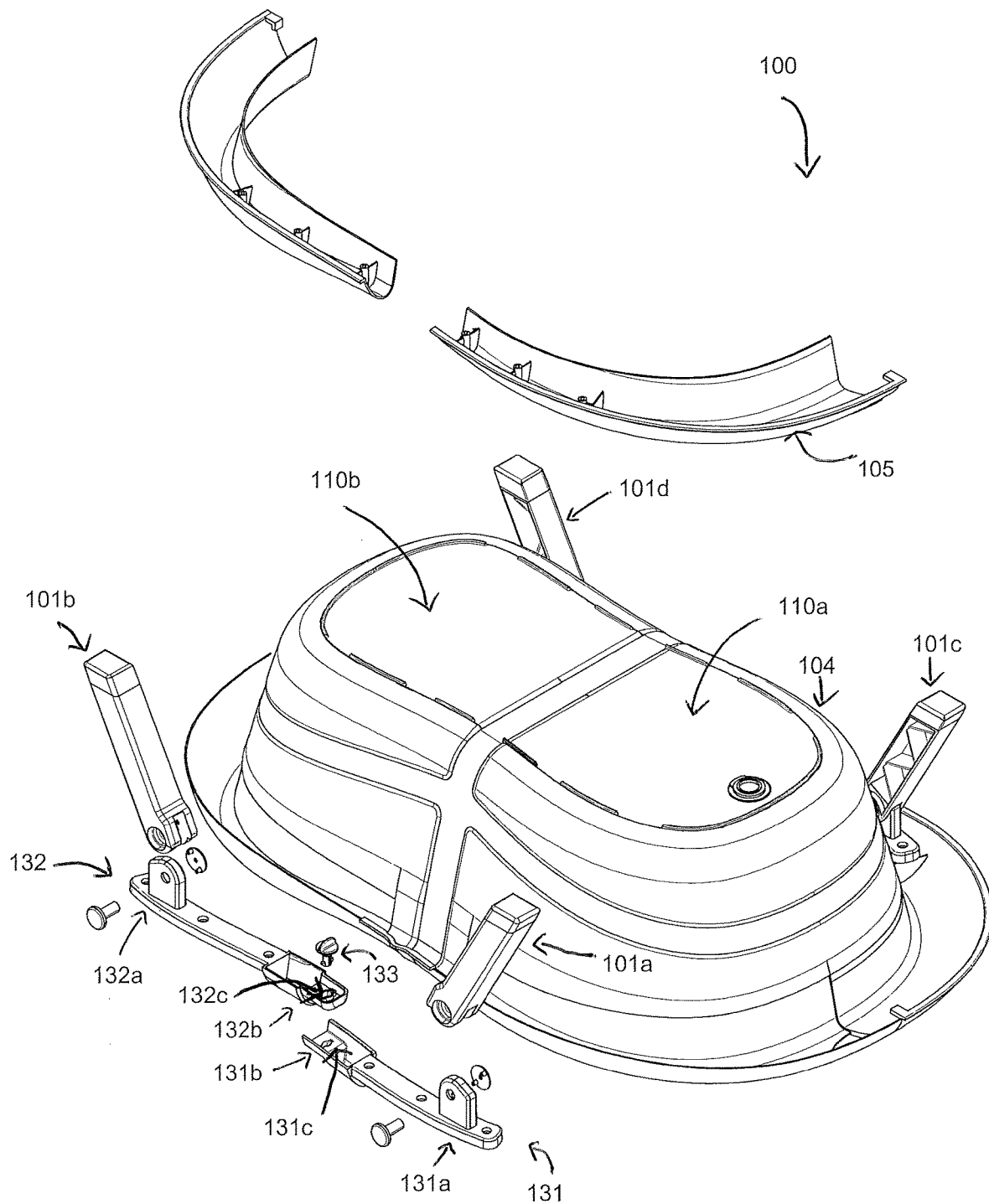


Fig. 3

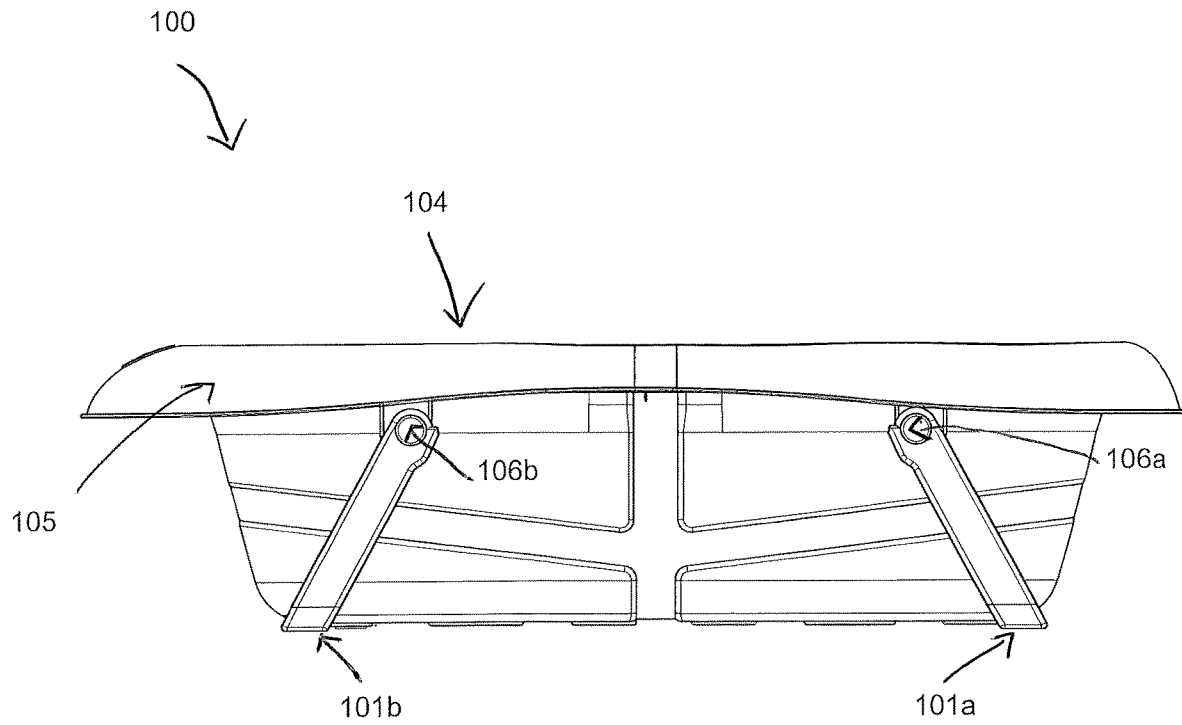


FIG. 4

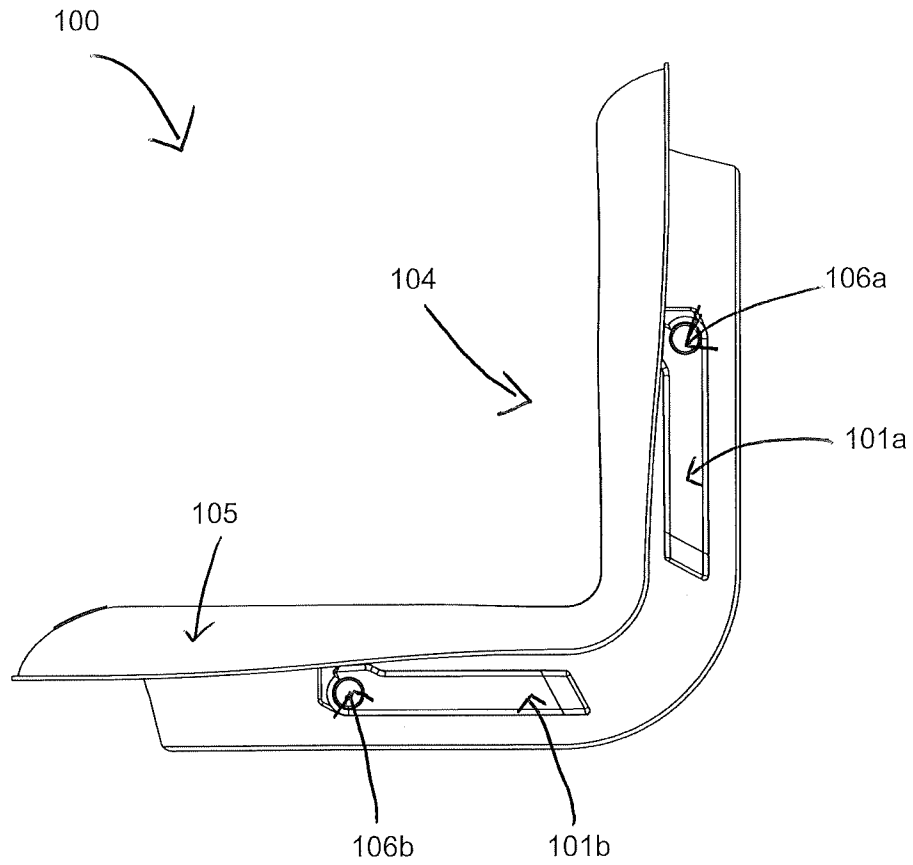


FIG. 5a

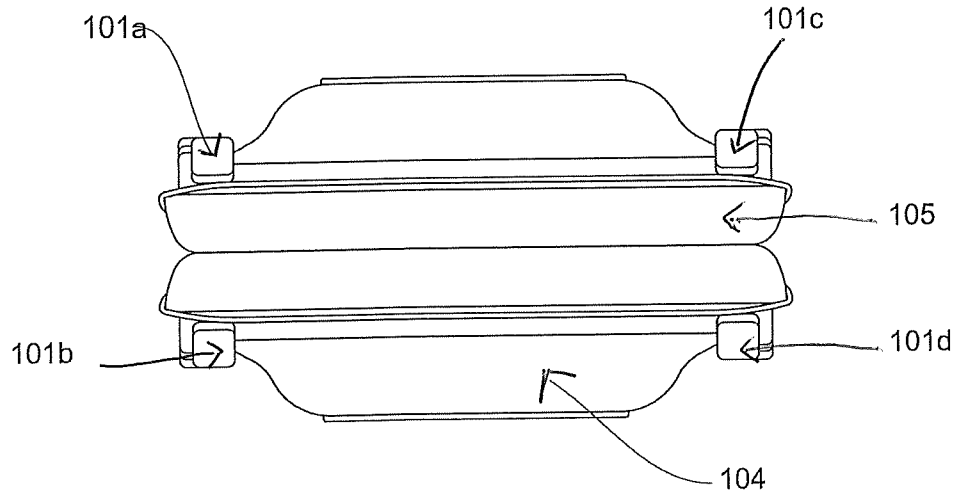


FIG. 5b

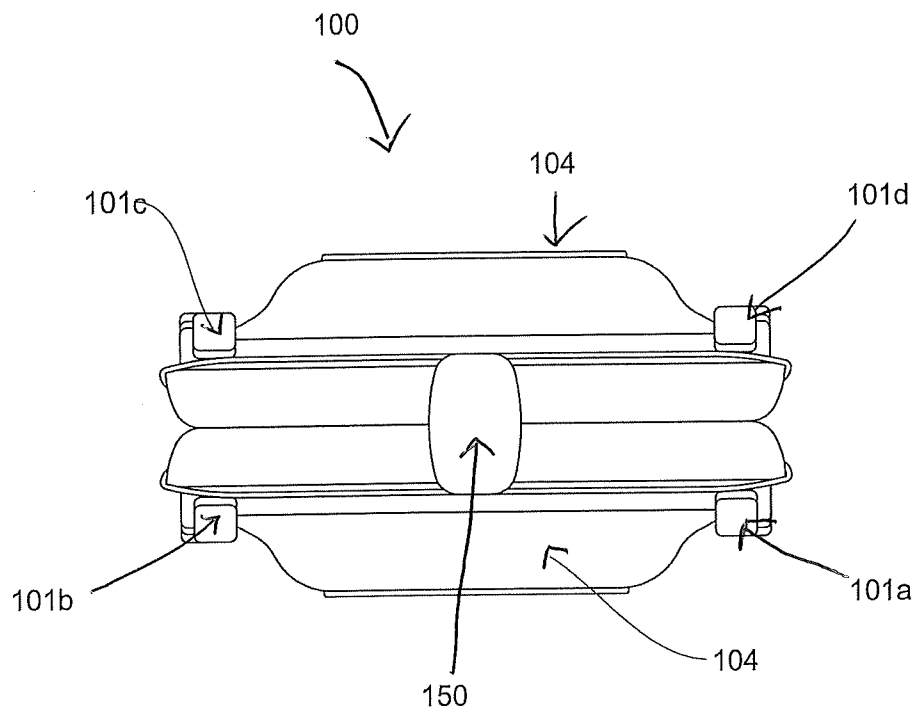


FIG. 5c

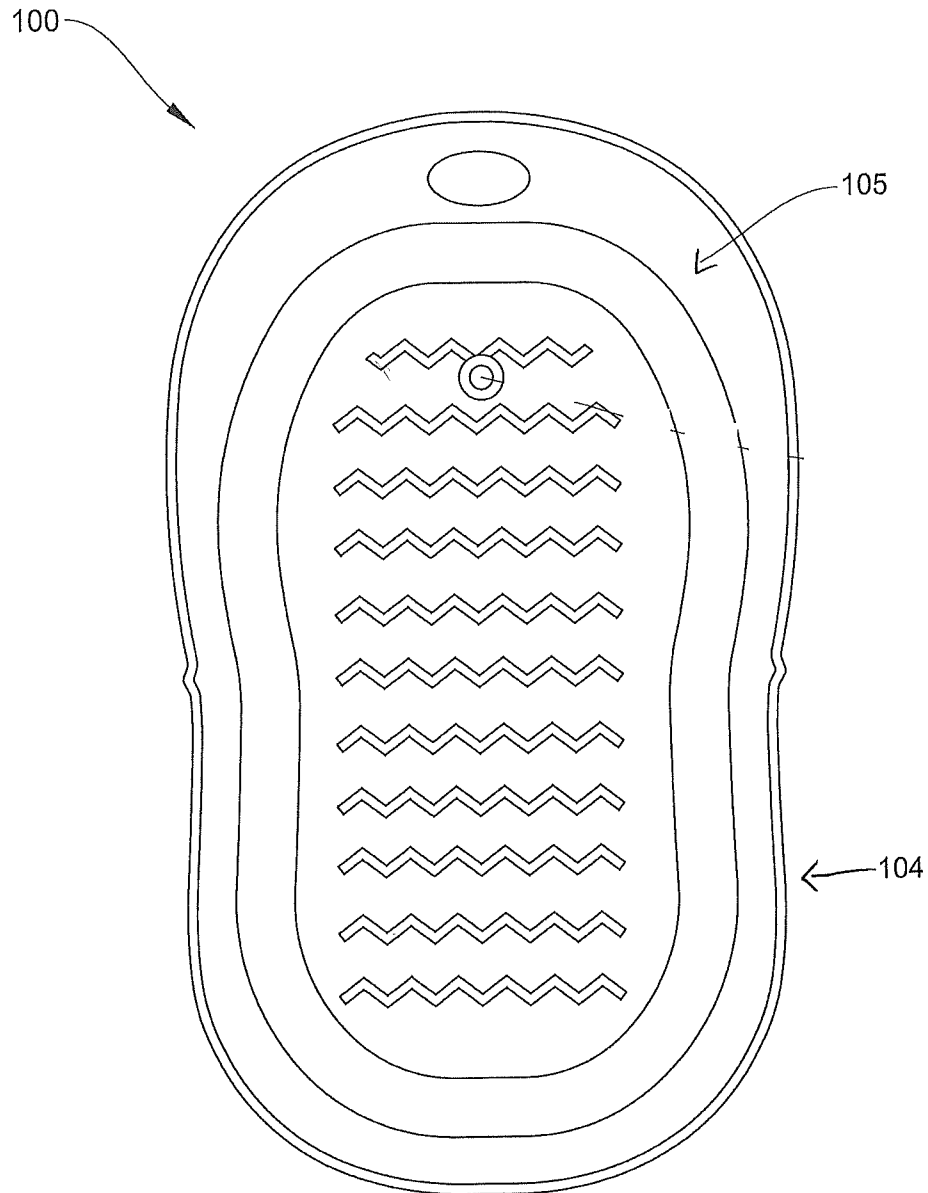


FIG. 6

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**PORTABLE, FOLDABLE, COLLAPSIBLE
BATHTUB****CROSS-REFERENCES TO RELATED
APPLICATIONS****[0001]** Not Applicable**STATEMENT REGARDING FEDERALLY
SPONSORED RESEARCH OR DEVELOPMENT****[0002]** Not Applicable**INCORPORATION-BY-REFERENCE OF
MATERIAL SUBMITTED ON A COMPACT
DISC****[0003]** Not Applicable**BACKGROUND**

[0004] Infants and younger children are difficult to bathe in standard bathtubs found in most bathrooms. Infants and young children become slippery when wet. This is dangerous because the caretaker may lose grasp allowing the infant or younger child to slip into the water. To avoid this problem, some caretakers may bathe their infants or younger children in bathroom or kitchen sinks; however, the sink must be cleaned before and after the bath to address hygiene issues. Bathtubs made for infants and younger children are known in the art; however, in smaller homes and apartments, caretakers may not be able to store a bathtub. What is needed is a bathtub for infants and younger children that can be more easily stored.

BRIEF DESCRIPTION OF INVENTION

[0005] A portable, foldable, collapsible bathtub for infants or younger children that can collapse allowing for easy storage.

**DESCRIPTION OF THE SEVERAL VIEWS OF
THE DRAWINGS**

[0006] Other features and advantages of the present invention will become apparent in the following detailed descriptions of the preferred embodiment with reference to the accompanying drawing.

[0007] FIG. 1 is a side, perspective view of an embodiment of the portable, foldable, collapsible bathtub;

[0008] FIG. 2 is a bottom view of an embodiment of the portable, foldable, collapsible bathtub;

[0009] FIG. 3 is an exploded view of the portable, foldable, collapsible bathtub;

[0010] FIG. 4 is a side view of an embodiment of the portable, foldable, collapsible bathtub with the leg members in a non-operational position

[0011] FIG. 5A is a side view of an embodiment of the portable, foldable, collapsible bathtub in a non-operational position;

[0012] FIG. 5B is a front view of an embodiment of the portable, foldable, collapsible bathtub in a non-operational position;

[0013] FIG. 5C is a front view of an embodiment of the portable, foldable, collapsible bathtub in a folded and locked position;

[0014] FIG. 6 is a top view of the portable, foldable, collapsible bathtub in an operational position.

**DETAILED DESCRIPTION OF THE
INVENTION**

[0015] In the following detailed description, reference is made to the accompanying drawings, which form a part hereof. In the drawings, the use of similar or the same symbols in different drawings typically indicates similar or identical items, unless context dictates otherwise.

[0016] The illustrative embodiments described in the detailed description, drawings, and claims are not meant to be limiting. Other embodiments may be utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented here.

[0017] One skilled in the art will recognize that the herein described components (e.g., operations), devices, objects, and the discussion accompanying them are used as examples for the sake of conceptual clarity and that various configuration modifications are contemplated. Consequently, as used herein, the specific exemplars set forth and the accompanying discussion are intended to be representative of their more general classes. In general, use of any specific exemplar is intended to be representative of its class, and the non-inclusion of specific components (e.g., operations), devices, and objects should not be taken as limiting.

[0018] The present application uses formal outline headings for clarity of presentation. However, it is to be understood that the outline headings are for presentation purposes, and that different types of subject matter may be discussed throughout the application (e.g., device(s)/structure(s) may be described under process(es)/operations heading(s) and/or process(es)/operations may be discussed under structure(s)/process(es) headings; and/or descriptions of single topics may span two or more topic headings). Hence, the use of the formal outline headings is not intended to be in any way limiting. Given by way of overview, illustrative embodiments include a portable, foldable, collapsible bathtub **100**.

[0019] Referring initially to FIGS. 1-6, in an embodiment, the portable, foldable, collapsible bathtub **100** includes a tub section **104** where the tub section **104** has a centrally disposed longitudinal axis and defines a cavity **104a**, in its operational position, discussed further below, for supporting an infant or a small child during bathing. In an embodiment, the tub section **104** is made from rubber, silicone or other similar material that allows the tub cavity **104a** to hold liquid. In one embodiment, the tub section **104** is made from thermoplastic rubber.

[0020] Referring to FIG. 3, in an embodiment, the bottom, outside portion of the tub cavity **104** is operably attached to at least two plates **110a**, **110b** (collectively, "plates **110**"). In an embodiment, the plates **110** are constructed from molded plastic or other similar material. In an embodiment, the bottom of the tub cavity **104** is flexible. In an embodiment, the tub **104** is flexible.

[0021] Referring to FIGS. 1-6, in an embodiment, a flange **105** is located along the top portion of the tub section **104**. This flange **105** extends perpendicularly outwardly from the tub section **104** and includes an upper surface **105a** (flange upper surface) and lower surface **105b** (flange lower surface). In an embodiment, the flange **105** is made from molded plastic such as polypropylene, or other similar material. In an embodiment, the thermoplastic rubber of the tub section **104** is operably attached to the flange upper surface **105a** so as to allow the tub cavity **104a** to hold liquid in the operational position. In an embodiment, the thermoplastic rubber of the tub section **104** is operably attached to

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the flange lower surface **105b** so as to allow the tub cavity **104a** to hold liquid in the operational position.

[0022] The tub section **104** is supported by leg members **101a**, **101b**, **101c**, **101d** (collectively, “leg members **101**”). The leg members **101** are operably attached to the flange lower surface **105b** so as to allow the leg members **101** to extend downwardly therefrom, away from the center-line of the tub section **104**. While the leg members **101** are shown as being attached to the flange lower surface **105b** by hinges **106a**, **106b**, **106c**, **106d** (collectively “hinges **106**”), the leg members **101** may be secured to the flange lower surface **105b** by other known attachment means that would allow the leg members **101** to be folded adjacent to the flange lower surface **105b**, when the portable, foldable, collapsible bathtub **100** is in the non-operational position; and extend downwardly therefrom, when the portable, foldable, collapsible bathtub **100** is in the operational position.

[0023] In an embodiment, when the leg members **101** are folded adjacent to the flange lower surface **105b**, they may be locked in place. In an embodiment, when the leg members **101** are extend downward from the tub section **104** in the operational position, the leg members **101** lock in place to provide a secure base.

[0024] In an embodiment, the hinges **106** are operably connected to locking members **131** and **132**. Locking member **131** is comprised of a hinge side **131a** and a locking side **131b**. Locking member **132** is comprised of a hinge side **132a** and a locking side **132b**. Locking side **131b** is indented and defines a hole **131c**. Locking side **132b** is protruded and defines a protuberance **132c**. When the leg members **101** are extended downwardly from the flange **105** the indentation of locking side **131b** accepts the protrusion of locking side **132b**. In an embodiment, fastener **133** secures members **131** and **132** in place to provide a stable base for the tub section **104**. Fastener **133** may be a cotter, spring pin, dowl, screw, or another known fastener.

[0025] Referring to FIG. 1, in an embodiment, in its operational position, the portable, foldable, collapsible bathtub **100** defines the cavity portion **104a** and the leg members **101** are pulled downward from the flange **105** and locked in place when locking member **131** and locking member **132** mate.

[0026] Referring to FIGS. 2, 5A-5C, in an embodiment, in its nonoperational position, the portable, foldable, collapsible bathtub **100**, does not define a cavity portion **104a**. The leg members **101** are folded adjacent to the flange lower surface **105b**. Referring to FIG. 5C, in an embodiment, the portable, foldable, collapsible bathtub **100** may be folded, while in its nonoperational position by matching the ends of the horizontal axis. The ends may be secured together by lock **150**. In an embodiment, the user may help the cavity portion **104a** collapse by applying pressure on the plates **110**.

We claim as our invention:

1. A portable, foldable, collapsible bathtub therein comprising:

a tub section, a flange, leg members;

wherein the tub section has a centrally disposed longitudinal axis and defines a cavity, in its operational position;

wherein the flange extends perpendicularly out from the tub section and has a top surface and a bottom surface;

wherein the bottom surface is flexible;

wherein the bottom surface is comprised of at least two plates that are operably attached to the flexible bottom surface;

wherein the bottom surface of the flange is operably connected to the leg members having an operational position and nonoperational position;

whereby, the cavity collapses in its nonoperational position.

2. The portable, foldable, collapsible bathtub of claim 1 whereby in the nonoperational position, the tub section folds along a horizontal axis.

3. The portable, foldable, collapsible bathtub of claim 1 whereby, the tub section is manufactured from at least one taken from the group of rubber, silicon, polyvinyl chloride cloth, Ethylene-vinyl acetate, thermoplastic rubber.

4. A method to put a portable, foldable, collapsible bathtub in an operational position where the portable, foldable, collapsible bathtub is comprised of:

a tub section, a flange, leg members;

wherein the bottom portion of the sub section is comprised of at least two plates;

wherein the tub section has a centrally disposed longitudinal axis and defines a cavity, in its operational position;

wherein the flange extends perpendicularly out from the tub and has a top surface and a bottom surface;

wherein the bottom surface of the flange is operably connected to the leg members having an operational position and nonoperational position;

whereby, a user allows the centrally disposed longitudinal axis to define a cavity.

5. A method to put a portable, foldable, collapsible bathtub in a nonoperational position where the portable, foldable, collapsible bathtub is comprised of:

a tub section, a flange, leg members;

wherein the bottom surface of the tub section is comprised of at least two plates;

wherein the tub section has a centrally disposed longitudinal axis and defines a cavity, in its operational position;

wherein the flange extends perpendicularly out from the tub section and has a top surface and a bottom surface;

wherein the bottom surface of the flange is operably connected to the leg members having an operational position and a nonoperational position;

whereby, a user collapses the cavity.

6. The method of claim 5 where the portable, foldable, collapsible bathtub is folded along the horizontal axis.

* * * * *

EXHIBIT B



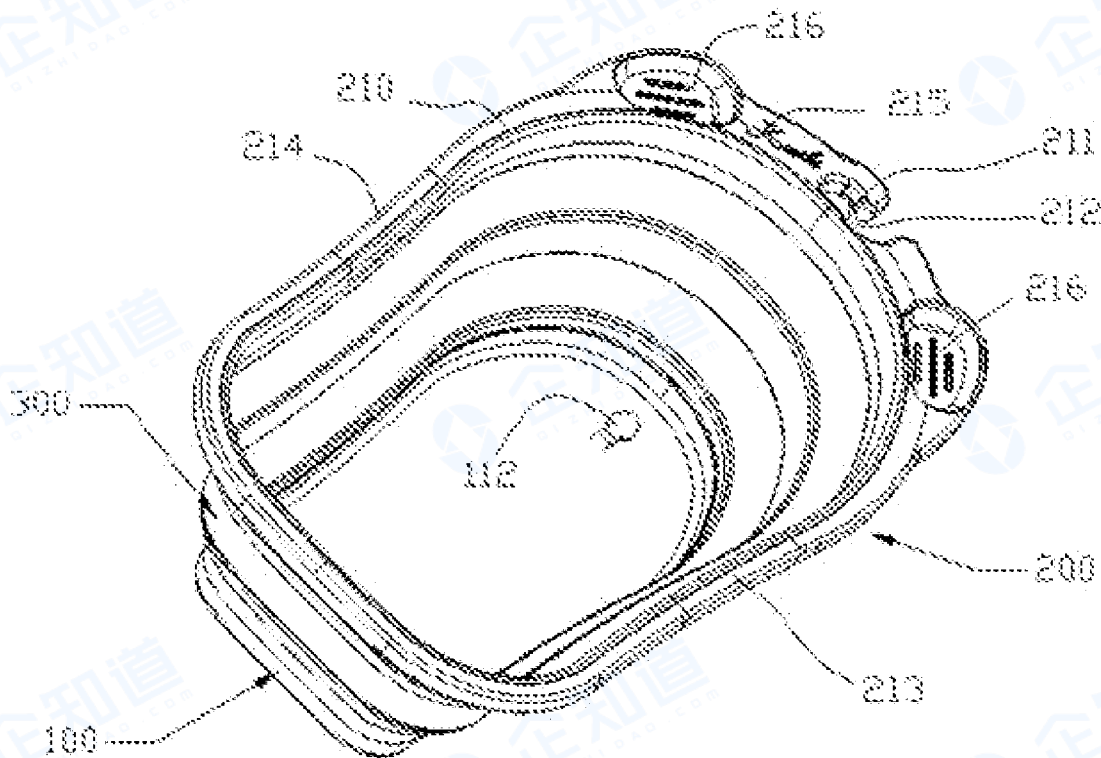
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(19) **United States**(12) **Patent Application Publication**
Yeung(10) **Pub. No.: US 2013/0198947 A1**(43) **Pub. Date: Aug. 8, 2013**(54) **FOLDABLE BATH TUB****Publication Classification**(75) Inventor: **Kwok Lam Yeung**, Hong Kong (CN)(51) **Int. Cl.**
A47K 3/06 (2006.01)(73) Assignee: **KARIBU BABY LTD.**, Hong Kong (CN)(52) **U.S. Cl.**
CPC **A47K 3/06** (2013.01)
USPC **4/559; 4/585**(21) Appl. No.: **13/519,844**(22) PCT Filed: **Mar. 11, 2011**(86) PCT No.: **PCT/CN2011/071714**§ 371 (c)(1),
(2), (4) Date: **Jun. 28, 2012**(30) **Foreign Application Priority Data**

Oct. 22, 2010 (CN) PCT/CN2010/078026

(57) **ABSTRACT**

A foldable bath tub includes a bottom board (100), a panel (200) and a foldable circular basin wall (300) connected between the bottom board (100) and the panel (200). The bottom board (100) and the panel (200) are both formed by one-shot injection molding and the circular basin wall (300) is formed by two-shot injection molding.



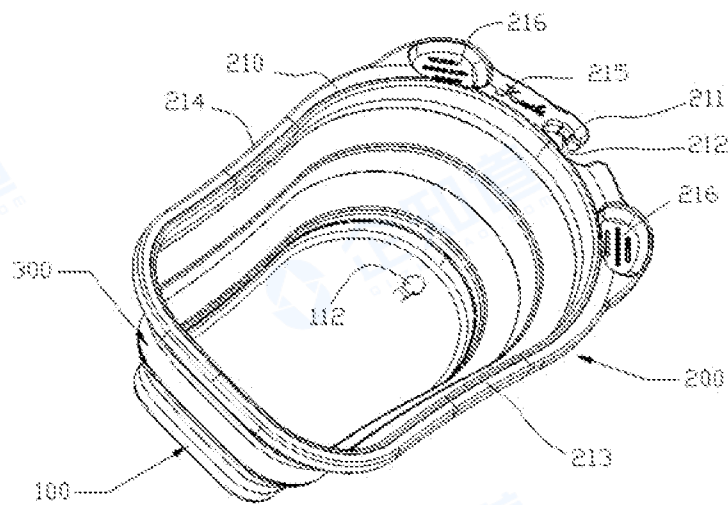


Fig. 1

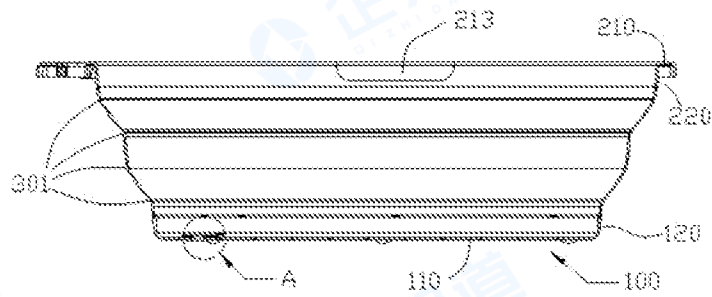


Fig. 2

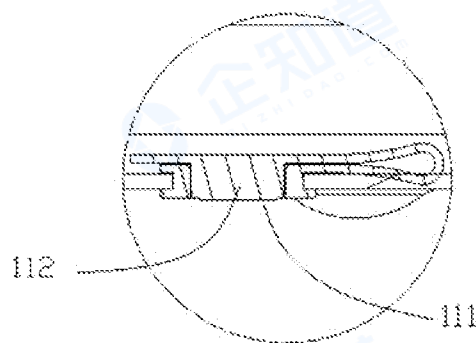


Fig. 3

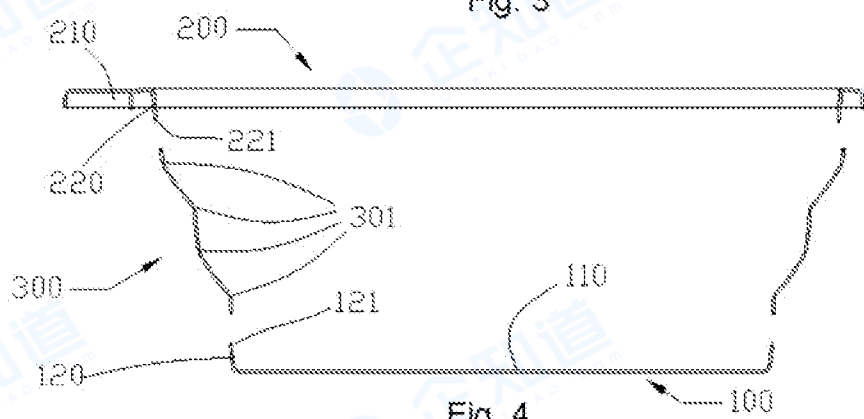


Fig. 4

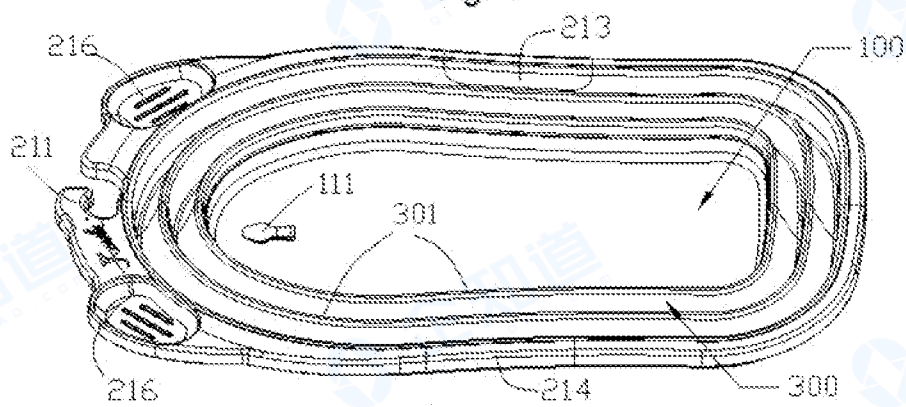


Fig. 5

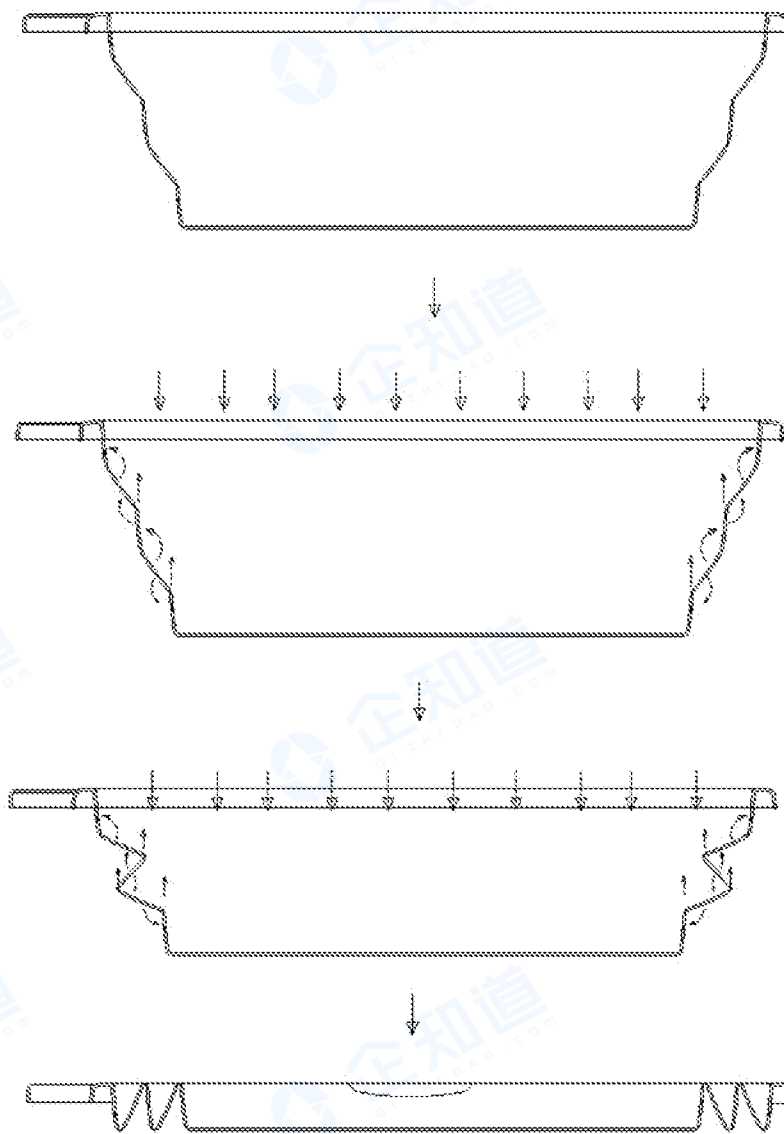


Fig. 6

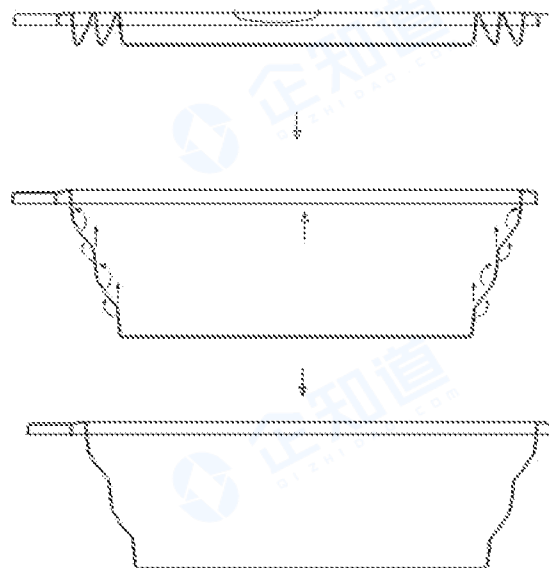


Fig. 7

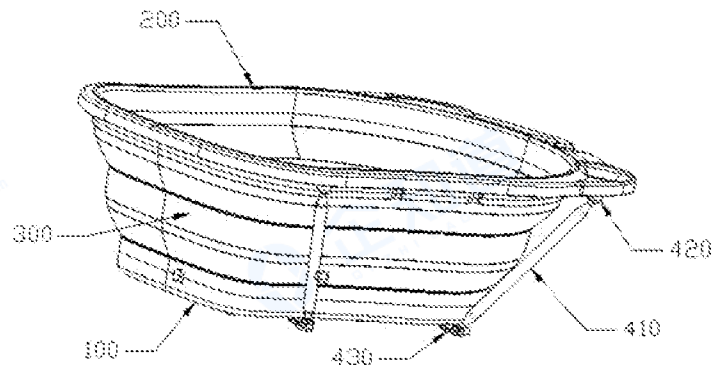


Fig. 8

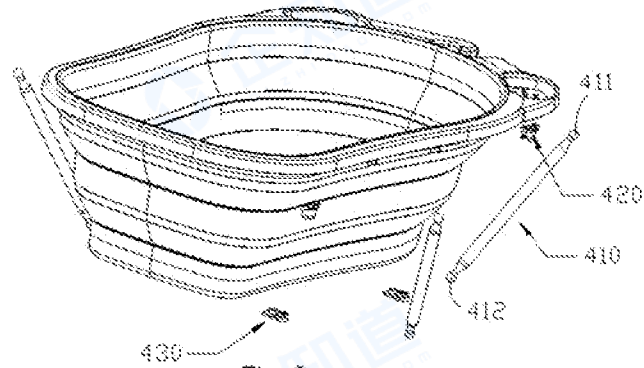


Fig. 9

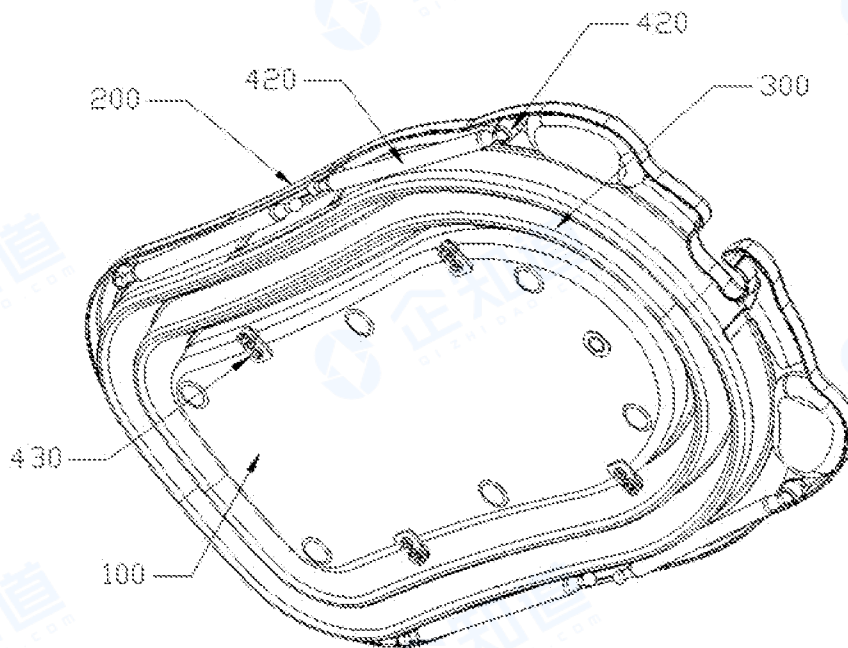
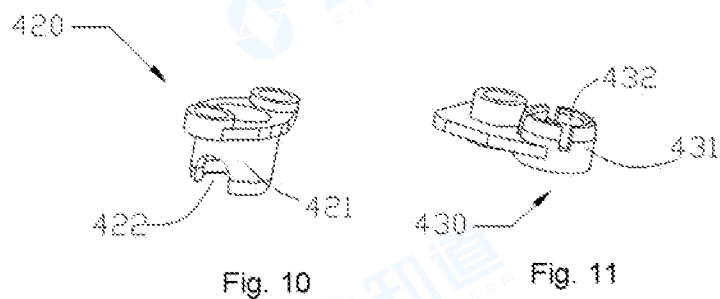


Fig. 12

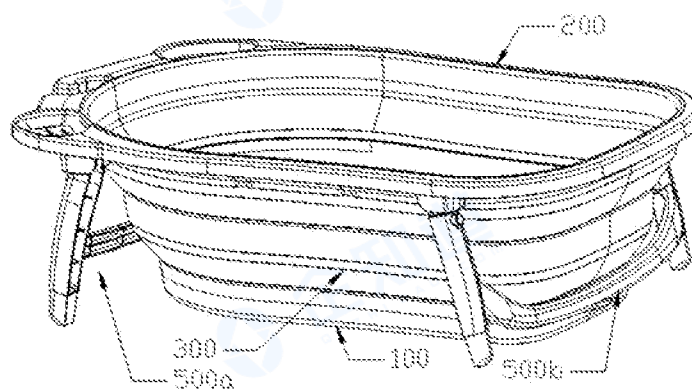


Fig. 13

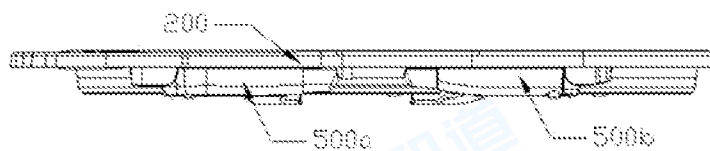


Fig. 14

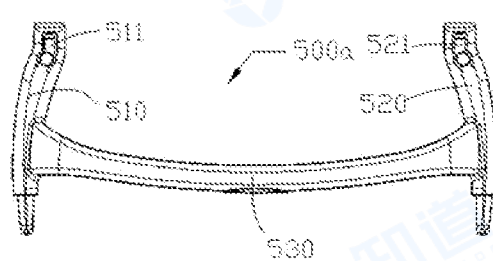


Fig. 15a



Fig. 15b

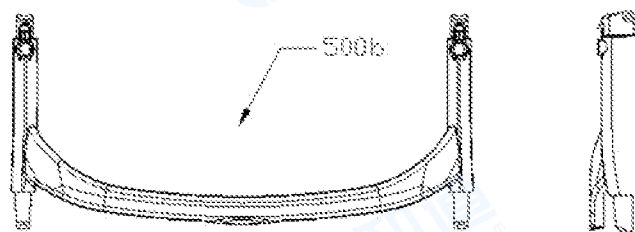


Fig. 16a

Fig. 16b

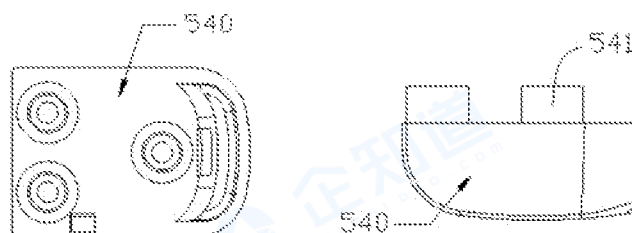


Fig. 17a

Fig. 17b

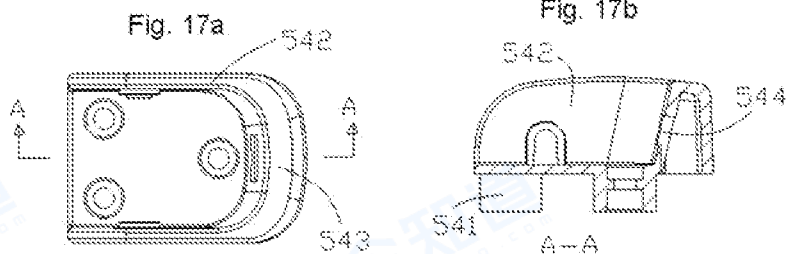


Fig. 17c

Fig. 17d

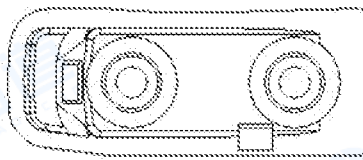


Fig. 18a

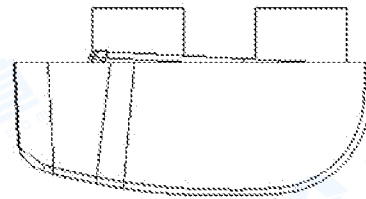


Fig. 18b

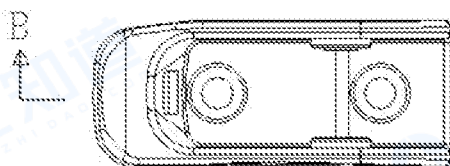
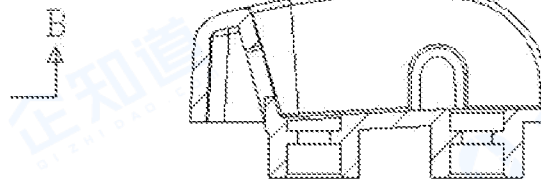


Fig. 18c



B—B

Fig. 18d

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FOLDABLE BATH TUB**FIELD OF THE INVENTION**

[0001] The present invention relates to bath tubs, more particularly, to a foldable bath tub.

BACKGROUND OF THE UTILITY MODEL

[0002] For most families, especially for those with children in the family, a bath tub is required for the reason that conventional baths in rest rooms are always too large for a child. In addition, because a bath tub normally has very large volume, it will take up large space for placement. When the bath tub is not in use, it's hard for users to find space for placing the bath tub. For this reason, there are some kinds of foldable bath tubs in the market at present. For example, these foldable bath tubs generally comprise a foldable supporting frame and a main body made of flexible material. In these cases, the main body is supported by the foldable supporting frame. Such bath tubs have a large number of elements, thus being inconvenient for operating when folded and unfolded. Furthermore, a fold line based on which the folding or unfolding is performed can be easily worn, causing water leakage in these worn places.

SUMMARY OF THE UTILITY MODEL

[0003] The objective of the present invention is to provide a foldable bath tub with less elements and easy operation, aiming at the above mentioned drawbacks including that the foldable bath tub in the prior art has too many elements and inconvenient operation.

[0004] According to an aspect of the present invention, a foldable bath tub is provided which includes a bottom board, a panel and a foldable circular basin wall connected between the bottom board and the panel; the bottom board and the panel are both formed by one-shot injection molding and the circular basin wall is formed by two-shot injection molding through thermoplastic elastomer.

[0005] In the foldable bath tub of the present invention, the circular basin wall comprises plurality of annular creases parallel with the bottom board, along which the circular basin wall can be folded toward the bottom board.

[0006] In the foldable bath tub of the present invention, the bottom board comprises a plane part and a lower connection wall which extends upward from edges of the plane part and connects with the circular basin wall.

[0007] In the foldable bath tub of the present invention, the lower connection wall comprises a bottom groove at the upper end thereof, wherein the bottom groove extends in the lower connection wall circumferentially for a whole periphery and is filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0008] In the foldable bath tub of the present invention, the bottom groove comprises several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0009] In the foldable bath tub of the present invention, the bottom board is arranged with a water outlet, and the foldable bath tub further comprises a rubber stopper adaptive with the water outlet.

[0010] In the foldable bath tub of the present invention, the panel comprises an annular edge element and an upper con-

nection wall which extends downward from the edge element and connects with the circular basin wall.

[0011] In the foldable bath tub of the present invention, the upper connection wall comprises a cover groove at the lower end thereof, wherein the cover groove extends in the upper connection wall circumferentially for a whole periphery and is filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0012] In the foldable bath tub of the present invention, the cover groove comprises several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0013] In the foldable bath tub of the present invention, the edge element is provided with a hooked part, and an inner side of the hooked part is covered with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0014] In the foldable bath tub of the present invention, two opposite sides of the edge element are provided with a handgrip; the handgrip is provided with raised reinforcing ribs and a groove in the annular part; wherein the groove is coated with the thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

[0015] In the foldable bath tub of the present invention, an upper surface of the annular part comprises a concave pattern that is provided with through holes; the thermoplastic elastomer passes through the through holes and then fills in such concave pattern when preparing the circular basin wall during the two-shot injection molding process.

[0016] In the foldable bath tub of the present invention, the edge element comprises a storage groove for placing various items.

[0017] In the foldable bath tub of the present invention, the foldable bath tub further comprises plurality of detachable supporting bars arranged between the panel and the bottom board; the supporting bar is at the outer side of the circular basin wall; when the foldable bath tub is unfolded, the supporting bar supports both the panel and the bottom board; when the foldable bath tub is folded, the supporting bar locates below the panel.

[0018] In the foldable bath tub of the present invention, the foldable bath tub comprises four supporting bars each of which has a round first end and a round second end; a lower surface of the panel is provided with four upper fixtures which comprises an upper hollow cylinder for accommodating the first end of the supporting bar, and the upper hollow cylinder is provided with a gap for the rotation of the supporting bar; the bottom board is provided with four corresponding lower fixtures which comprises a lower hollow cylinder for accommodating the second end of the supporting shaft, and the lower hollow cylinder is provided with a blocking part at an end thereof, wherein the blocking part can be opened by external force; the first end of the supporting bar is inserted into the upper hollow cylinder, and the second end of the supporting bar is inserted into the lower hollow cylinder when the foldable bath tub is unfolded and is pulled out of the lower hollow cylinder when the foldable bath tub is folded.

[0019] In the foldable bath tub of the present invention, the rubber stopper is provided with a temperature indicator layer that changes color according to temperature.

[0020] In the foldable bath tub of the present invention, the foldable bath tub comprises two foldable supporting frames on a lower surface of the panel and the two foldable support-

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ing frames are located opposite with each other; when the foldable bath tub is unfolded, the foldable supporting frames are unfolded to support the panel; when the foldable bath tub is folded, the foldable supporting frames are folded to lean against the lower surface of the panel.

[0021] In the foldable bath tub of the present invention, the foldable supporting frame comprises two supporting legs and a lateral part connected between the two supporting legs; the foldable supporting frame also comprises two connectors that are in rotary connection with the upper ends of the supporting legs and in permanent connection with the lower surface of the panel.

[0022] In the foldable bath tub of the present invention, the upper end of the supporting leg is provided with a flexible fastener, and the connector is provided with a fastener position adaptive with the flexible fastener; when the foldable supporting frame is unfolded, the flexible fastener buckles into the fastener position.

[0023] In the foldable bath tub of the present invention, the connector is provided with a U-shaped periphery; when the foldable supporting frame is unfolded, the supporting legs locate against a bottom of the U-shaped periphery.

[0024] When implementing the foldable bath tub of the present invention, the following advantageous effect may be achieved: the foldable bath tub can be formed by plastics and thermoplastic elastomer through a one-shot injection molding process and a two-shot injection molding process respectively; the foldable bath tub is portable, simple in structure, convenient for folding or unfolding and small in volume, thus being suitable for using in home and during travelling.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The present invention is further described with respect to the accompanying drawings and embodiments in the following. In the figures:

[0026] FIG. 1 is a stereogram of a preferred embodiment of the foldable bath tub in the present invention;

[0027] FIG. 2 is a cross sectional view of a preferred embodiment of the foldable bath tub in the present invention;

[0028] FIG. 3 is an enlarged view showing part A in FIG. 2;

[0029] FIG. 4 an exploded view of a preferred embodiment of the foldable bath tub in the present invention;

[0030] FIG. 5 is a top view of a preferred embodiment of the foldable bath tub in a folding state in the present invention;

[0031] FIG. 6 illustrates the steps of folding a preferred embodiment of the foldable bath tub in the present invention;

[0032] FIG. 7 illustrates the steps of unfolding a preferred embodiment of the foldable bath tub in the present invention;

[0033] FIG. 8 is a schematic view of a second embodiment of the foldable bath tub in an unfolding state in the present invention;

[0034] FIG. 9 is an exploded diagram for a second embodiment of the foldable bath tub in the present invention;

[0035] FIG. 10 is a schematic view for an upper fixture in a second embodiment of the foldable bath tub in the present invention;

[0036] FIG. 11 is a schematic view for a lower fixture in a second embodiment of the foldable bath tub in the present invention;

[0037] FIG. 12 is a schematic view for a second embodiment of the foldable bath tub in a folding state in the present invention;

[0038] FIG. 13 is a schematic view for a third embodiment of the foldable bath tub in an unfolding state in the present invention;

[0039] FIG. 14 is a schematic view for a third embodiment of the foldable bath tub in a folding state in the present invention;

[0040] FIGS. 15a and 15b are schematic views for front supporting frames in a third embodiment of the foldable bath tub in the present invention;

[0041] FIGS. 16a and 16b are schematic views for rear supporting frames in a third embodiment of the foldable bath tub in the present invention;

[0042] FIGS. 17a-d are schematic views for front connectors in a third embodiment of the foldable bath tub in the present invention;

[0043] FIGS. 18a-d are schematic views for rear connectors in a third embodiment of the foldable bath tub in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0044] In order to make the technical feature, objective and effect of the present invention be understood more clearly, the specific implementations of the present invention is now illustrated in detail with reference to accompanying drawings.

[0045] FIGS. 1-5 show a preferred embodiment of the foldable bath tub in the present invention. The foldable bath tub comprises a bottom board 100, a panel 200 and an circular basin wall 300 which is foldable between the bottom board 100 and the panel 200. The bottom board 100 and the panel 200 are both formed by plastics (e.g. polypropylene (PP)) through a one-shot injection molding process. After the bottom board 100 and the panel 200 are formed, they are subsequently placed into a mould, in which case a two-shot injection molding process is carried out to form the circular basin wall 300. Wherein, the circular basin wall 300 can be formed by thermoplastic elastomer (TPE). TPE is one kind of environment-friendly and non-toxic material that has the same high flexibility, strength and resilience as those of rubber, as well as broad hardness range, excellent dyeing property, soft tactility, weather resistance, fatigue resistance and thermal tolerance. Besides, TPE possesses excellent manufacturing properties including that it can be suitable for injection molding (incl. two-shot injection molding), require no vulcanization and be covered with and adhered to substrate materials such as PP, polyethylene (PE), polycarbonate (PC), polystyrene (PS) and acrylate butyl styrene (ABS). During the step of forming the circular basin wall 300 in the two-shot injection molding process by the thermoplastic elastomer, the circular basin wall 300 is integrated with the injection molded bottom board 100 and the panel 200. The circular basin wall 300 comprises plurality of annular creases 301 parallel with the bottom board 100, along which the circular basin wall 300 can be folded toward the bottom board 100.

[0046] In this embodiment, in order to facilitate the connection between the bottom board 100 and the circular basin wall 300, the bottom board 100 comprises a plane part 110 and a lower connection wall 120 which extends upward from edges of the plane part 110 and further connects with the circular basin wall 300. The lower connection wall 120 comprises a bottom groove at the upper end 121 thereof, wherein the bottom groove extends in the lower connection wall 120 circumferentially for a whole periphery. The bottom groove is

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filled with thermoplastic elastomer when preparing the circular basin wall **300** during the two-shot injection molding process, thus forming a secure connection between the circular basin wall **300** and the bottom board **100**. Herein, the expression “bottom groove” refers to a groove formed in the upper end **121** of the lower connection wall **120**. It is used for increasing the adhesive area between the thermoplastic elastomer and the lower connection wall **120** during the two-shot injection molding process in order to form a reliable connection therebetween. Further, the bottom groove is provided with several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall **300** during the two-shot injection molding process so as to improve connection reliability therebetween. The plane part **110** of the bottom board **100** further comprises a water outlet **111** for releasing water conveniently, and the foldable bath tub also comprises a rubber stopper **112** adaptive with the water outlet **111**. The rubber stopper **112** may be fixed onto the plane part **110** of the bottom board **100** through a flexible strip, or be provided separately with respect to the bottom board **100**. For the convenience of indicating water temperature for users, the bottom board **100** or the rubber stopper **112** may be provided with a temperature indicator layer made of such materials that change color according to temperature, in which case the user can determine whether the water temperature is suitable by reading the color of the temperature indicator layer. For example, it is predetermined that such temperature indicator layer would change color when the water temperature exceeds 37° C.

[0047] In this embodiment, in order to facilitate the connection between the panel **200** and the circular basin wall **300**, the panel **200** comprises an annular edge element **210** and an upper connection wall **220** which extends downward from the edge element **210** and further connects with the circular basin wall **300**. The upper connection wall **220** comprises a cover groove at the lower end **221** thereof, wherein the cover groove extends in the upper connection wall **220** circumferentially for a whole periphery. The cover groove is filled with thermoplastic elastomer when preparing the circular basin wall **300** during the two-shot injection molding process, thus forming a secure connection between the circular basin wall **300** and the panel **200**. Herein, the expression “cover groove” refers to a groove formed on the lower end **221** of the upper connection wall **220**. It is used for increasing the adhesive area between the thermoplastic elastomer and the upper connection wall **220** during the two-shot injection molding process in order to form a reliable connection therebetween. Further, the cover groove is provided with several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall **300** during the two-shot injection molding process so as to improve the connection reliability therebetween.

[0048] In this embodiment, the edge element **210** comprises a hooked part **211** so as to facilitate the storage of folded bath tub. An inner side **212** of the hooked part **211** is coated with the thermoplastic elastomer when preparing the circular basin wall **300** during the two-shot injection molding process. In this way, the friction force between the hooked part **211** and a shaft for holding the hooked part such as a rack in the rest room can be increased to achieve an anti-slide effect.

[0049] In this embodiment, two opposite sides of the edge element **210** are provided with a handgrip **213**, **214** respectively. The two handgrips **213**, **214** are both arranged with

raised reinforcing ribs to improve the strength herein. Besides, these two handgrips **213**, **214** are provided with a groove in the annular part **210** respectively to achieve better handing feeling thereof. When preparing the circular basin wall **300** during the two-shot injection molding process, the groove is coated with the thermoplastic elastomer so that a thermoplastic elastomer cover layer is formed on the handgrips **213**, **214** to improve their hand feeling.

[0050] In this embodiment, an upper surface of the edge element **210** comprises a concave pattern **215** that is provided with through holes. The thermoplastic elastomer passes through the through holes and then fills in such concave pattern when preparing the circular basin wall **300** during the two-shot injection molding process. In an embodiment, the panel **200** has a different color from that of the thermoplastic elastomer, so that a colorful pattern may be formed on the edge element **210**. Such pattern may be used for decoration or indication such as trademark or instructions. Further, the edge element **210** comprises a storage groove **216** for placing various items including bath products such as soap or towel for convenience.

[0051] In this embodiment, the foldable bath tub has a runway-shaped cross section. However, the cross section of the bath tub should not be limited to such shape. In fact, it can have a round shape or any suitable shapes. The circular basin wall may be colorful or transparent.

[0052] Referring to FIG. 6, it shows how the foldable bath tub of the present invention is folded. At first, the unfolded foldable bath tub is placed on the ground. Then both handgrips **213**, **214** on the edge element **210** are pressed downward to fold the circular basin wall **300** along the annular creases **301**. Finally, the foldable bath tub can be folded to take up small space. FIG. 7 in turn shows the steps of unfolding the folded foldable bath tub. After the bottom board **100** of the bath tub is fixed, both handgrips **213**, **214** on the edge element **210** are pulled upward to unfold the circular basin wall and thus the foldable bath tub along the annular creases **301**. When the water outlet **111** is blocked, the foldable bath tub is ready for use.

[0053] FIGS. 8, 9 and 12 illustrate a second embodiment of the foldable bath tub in the present invention. Further improvement is performed in this embodiment on the basis of the above mentioned preferred embodiment. In order to provide improved strength for the foldable bath tub in its unfolding state, plurality of detachable supporting bars **410** are arranged between the panel **200** and the bottom board **100** so that the foldable bath tub is prevented from being folded when pressed by external force during its unfolding state for usage. Specifically, the supporting bar **410** is at the outer side of the circular basin wall **300**. When the foldable bath tub is unfolded, the supporting bar **410** supports both the panel **200** and the bottom board **100** for improving the strength of the foldable bath tub; when the foldable bath tub is folded, the supporting bar **410** locates below the panel **200** to reduce space consumption.

[0054] In the second embodiment, as shown in FIGS. 10 and 11, the foldable bath tub comprises four supporting bars **410**, each of which has round ends; wherein two opposite sides of the bath tub are respectively arranged with two of such supporting bars. A lower surface of the panel **200** is provided with four upper fixtures **420** made of plastics. The upper fixture **420** comprises an upper hollow cylinder **421** for accommodating a first end **411** of the supporting bar **410**, and the upper hollow cylinder **421** is further provided with a gap

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422 for the rotation of the supporting bar **410**. The bottom board **100** is provided with four corresponding lower fixtures **430** which are also made of plastic. The lower fixture **430** comprises a lower hollow cylinder **431** for accommodating a second end **412** of the supporting shaft **410**, and the lower hollow cylinder **431** is provided with a blocking part **432** at an end thereof. The blocking part **432** can be opened by external force. In this embodiment, there are four blocking parts **432** for fixing the second end **412** of the supporting bar **410**. The first end **411** of the supporting bar **410** is inserted into the upper hollow cylinder **421**. The supporting bar **410** can rotate against the panel **200** due to the existence of the gap **422** and its round end. When the foldable bath tub is unfolded, the supporting bar **410** is unfolded against the panel **200**, in which case its second end **412** moves away from the panel **200** and toward the bottom board **100**. Because the blocking part **432** at the end of the lower hollow cylinder **431** of the lower fixture **430** can be opened, the second end **412** is easily inserted into the lower hollow cylinder **431** by external force. In that way, the strength of the foldable bath tub can be improved. When it is needed to fold the foldable bath tub, the second end **412** of the supporting bar **410** is pulled out of the lower hollow cylinder **431**, and then the supporting bar **410** is rotated so as to lean against the lower surface of the panel **100** as shown in FIG. 12.

[0055] The upper fixtures **420** and lower fixtures **430** in the second embodiment are both made of plastics, and they can be secured onto the panel **200** and bottom board **100** by screws respectively. Further, a lower surface of the bottom board **100** is provided with a U-shaped slot for holding the lower fixture **430**. Other structures in this embodiment are the same as those in the preferred embodiment, which are thus not repeated herein.

[0056] FIGS. 13 and 14 illustrate a third embodiment of the foldable bath tub in the present invention. Further improvement is performed in this embodiment on the basis of the above mentioned preferred embodiment. In order to provide improved strength for the foldable bath tub in its unfolding state, the foldable bath tub comprises two foldable supporting frames **500a**, **500b** on a lower surface of the panel **200**, so that the foldable bath tub is prevented from being folded when pressed by external force during its unfolding state for usage. Specifically, the reference number **500a** refers to a front supporting frame provided at a front end of the foldable bath tub, while the reference number **500b** relates to a rear supporting frame provided at a rear end of the foldable bath tub. The two foldable supporting frames **500a**, **500b** are located opposite with each other. When the foldable bath tub is unfolded, the two foldable supporting frames **500a**, **500b** are unfolded to support the panel **200** to improve the strength of the foldable bath tub and prevent the foldable bath tub from being folded during use. As shown in FIG. 14, when the foldable bath tub is folded, the two foldable supporting frames **500a**, **500b** are folded to lean against the lower surface of the panel **200**, thus reducing space consumption during storage.

[0057] In this embodiment, the two foldable supporting frames **500a**, **500b** have approximately similar structures. The only difference lies in that their shapes are relatively different from each other since they are located in different positions and they should be adaptive with the shape of the bath tub. As shown in FIGS. 15a and 15b, the specific structure of the foldable supporting frame is illustrated taking the supporting frame **500a** as an example. The foldable supporting frame **500a** comprises two supporting legs **510**, **520** and a

lateral part **530** connected between the two supporting legs **510**, **520**. Since the two supporting legs **510**, **520** are connected together by the lateral part **530**, the strength of the foldable supporting frame **500a** can be improved to achieve a better load bearing effect. The supporting legs **510**, **520** and the lateral part **530** can be injection molded as a whole, or else they can be molded separately and then connected together. Besides, the foldable supporting frame **500a** also comprises two connectors **540** in rotary connection with an upper end of the supporting legs **510**, **520** correspondingly and in permanent connection with the lower surface of the panel **200**. Referring to FIGS. 17a-17d, they are schematic views for the foldable supporting frame **500a** in which FIG. 17a is a top view, FIG. 17b is a front view, FIG. 17c is a bottom view, and FIG. 17d is a cross sectional view along line A-A. The supporting legs **510**, **520** may be in rotary connection with the connector **540** by any common and suitable means. For example, a tenon is provided at ends of the supporting legs **510**, **520**, and a shaft hole adaptive with the tenon is correspondingly provided in the connector **540**. Alternatively, a rotating shaft is used for realizing the rotary connection between the upper ends of the supporting legs **510**, **520** and the connector **540**. An upper end of the connector **540** is provided with a connecting column **541**, as a result of which the connector can be fixed onto the panel **200** through a screw.

[0058] In this embodiment, the connector **540** further has a U-shaped periphery **542**. When the foldable supporting frame **500a** is unfolded, the supporting legs **510**, **520** locate against a bottom **543** of the U-shaped periphery **542**. An opening of the U-shaped periphery **542** makes the folded supporting legs **510**, **520** lean below the panel **200**. In order to keep the foldable supporting frames **500a** in an unfolding state and improve the safety of the foldable bath tub, the upper ends of the supporting legs **510**, **520** are provided with flexible fasteners **511**, **512**, and the connector **540** comprises a fastener position **544** adaptive with the flexible fasteners **511**, **512**. When the supporting frame **500a** is unfolded, the flexible fasteners **511**, **512** buckle into the fastener position **544** in order to keep the supporting frame **500a** in a unfolding state. When it is needed to be folded, the flexible fasteners **511**, **512** are pressed and the supporting legs **510**, **520** are rotated to fold the foldable supporting frame **500a**.

[0059] FIGS. 16a-16b and FIGS. 18a-18d illustrate the structure of the foldable supporting frame **500b**. Its structure is approximately the same as that of the foldable supporting frame **500a**, thus being not repeated herein.

[0060] In the present invention, the foldable bath tub can be formed by plastics and thermoplastic elastomer through a one-shot injection molding process and a two-shot injection molding process respectively. The foldable bath tub is portable, simple in structure, convenient for folding or unfolding and small in volume, thus being suitable for using in home and during travelling.

[0061] Although the embodiments of the present invention are described above with respect to the accompanying drawings, the present invention should not be limited to above mentioned specific implementations. The above mentioned specific implementations are for illustration instead of for limitation. Many forms can be carried out by those ordinary skills in the art with the teaching of the present invention without departing from the subject matter of the present invention and the scope of the claims. All these forms are within the scope of the present invention.

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1. A foldable bath tub, wherein comprising a bottom board, a panel and an circular basin wall between the bottom board and the panel; both the bottom board and the panel are formed by plastics through a one-shot injection molding process, and the circular basin wall is foldable and formed by thermoplastic elastomer through a two-shot injection molding process.

2. The foldable bath tub according to claim 1, wherein the circular basin wall comprises plurality of annular creases parallel with the bottom board, along which the circular basin wall can be folded toward the bottom board.

3. The foldable bath tub according to claim 2, wherein the bottom board comprises a plane part and a lower connection wall which extends upward from edges of the plane part and connects with the circular basin wall.

4. The foldable bath tub according to claim 3, wherein the lower connection wall comprises a bottom groove at the upper end thereof, wherein the bottom groove extends in the lower connection wall circumferentially for a whole periphery and is filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

5. The foldable bath tub according to claim 4, wherein the bottom groove comprises several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

6. The foldable bath tub according to claim 2, wherein the bottom board is arranged with a water outlet, and the foldable bath tub also comprises a rubber stopper adaptive with the water outlet.

7. The foldable bath tub according to claim 2, wherein the panel comprises an annular edge element and an upper connection wall which extends downward from the edge element and connects with the circular basin wall.

8. The foldable bath tub according to claim 6, wherein the upper connection wall comprises a cover groove at the lower end thereof, wherein the cover groove extends in the upper connection wall circumferentially for a whole periphery and is filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

9. The foldable bath tub according to claim 7, wherein the cover groove comprises several through holes which are filled with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

10. The foldable bath tub according to claim 7, wherein the edge element is provided with a hooked part, and an inner side of the hooked part is covered with thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

11. The foldable bath tub according to claim 7, wherein two opposite sides of the edge element are provided with a handgrip; the handgrip is provided with raised reinforcing ribs and a groove in the annular part; wherein the groove is coated with the thermoplastic elastomer when preparing the circular basin wall during the two-shot injection molding process.

12. The foldable bath tub according to claim 7, wherein an upper surface of the annual part comprises a concave pattern that is provided with through holes; the thermoplastic elastomer passes through the through holes and then fills in such

concave pattern when preparing the circular basin wall during the two-shot injection molding process.

13. The foldable bath tub according to claim 7, wherein the edge element comprises a storage groove for placing various items.

14. The foldable bath tub according to claim 2, wherein the foldable bath tub also comprise plurality of detachable supporting bars arranged between the panel and the bottom board; the supporting bar is at the outer side of the circular basin wall; when the foldable bath tub is unfolded, the supporting bar supports both the panel and the bottom board; when the foldable bath tub is folded, the supporting bar locates below the panel.

15. The foldable bath tub according to claim 14, wherein the foldable bath tub comprises four supporting bars each of which has a round first end and a round second end; a lower surface of the panel is provided with four upper fixtures which comprises an upper hollow cylinder for accommodating the first end of the supporting bar, and the upper hollow cylinder is provided with a gap for the rotation of the supporting bar; the bottom board is provided with four corresponding lower fixtures which comprises a lower hollow cylinder for accommodating the second end of the supporting shaft, and the lower hollow cylinder is provided with a blocking part at an end thereof, wherein the blocking part can be opened by external force; the first end of the supporting bar is inserted into the upper hollow cylinder, and the second end of the supporting bar is inserted into the lower hollow cylinder when the foldable bath tub is unfolded and is pulled out of the lower hollow cylinder when the foldable bath tub is folded.

16. The foldable bath tub according to claim 6, wherein the rubber stopper is provided with a temperature indicator layer that changes color according to temperature.

17. The foldable bath tub according to claim 2, wherein the foldable bath tub comprises two foldable supporting frames on a lower surface of the panel and the two foldable supporting frames are located opposite with each other; when the foldable bath tub is unfolded, the foldable supporting frames are unfolded to support the panel; when the foldable bath tub is folded, the foldable supporting frames are folded to lean against the lower surface of the panel.

18. The foldable bath tub according to claim 17, wherein the foldable supporting frame comprises two supporting legs and a lateral part connected between the two supporting legs; the foldable supporting frame also comprises two connectors that are in rotary connection with the upper ends of the supporting legs and in permanent connection with the lower surface of the panel.

19. The foldable bath tub according to claim 18, wherein the upper end of the supporting leg is provided with a flexible fastener and the connector is provided with a fastener position adaptive with the flexible fastener; when the foldable supporting frame is unfolded, the flexible fastener buckles into the fastener position.

20. The foldable bath tub according to claim 18, wherein the connector is provided with a U-shaped periphery; when the foldable supporting frame is unfolded, the supporting legs locate against a bottom of the U-shaped periphery.

* * * * *

EXHIBIT C

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(73) 专利权人 胡博洲

地址 518000 广东省深圳市罗湖区黄贝路
2134号碧波花园33栋204

专利权人 李烈宁 徐诚

(72) 发明人 胡博洲 李烈宁 徐诚

(74) 专利代理机构 深圳市千纳专利代理有限公司
44218

代理人 胡坚

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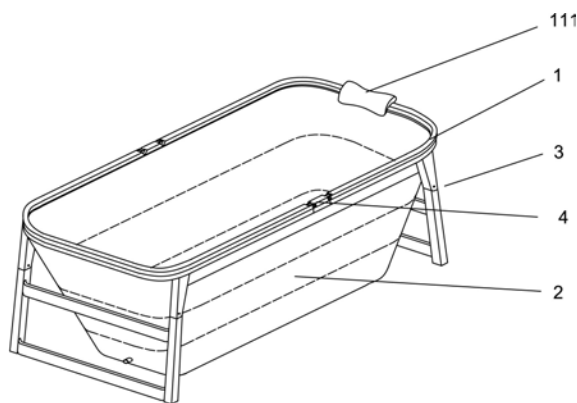
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(54) 实用新型名称

便携式折叠熏蒸浴缸

(57) 摘要

一种便携式折叠熏蒸浴缸,包括由硬质材料组成的浴缸顶边框、设于浴缸顶边框底边的可折叠软缸体及对称设于浴缸顶边1底边沿四角的,可折叠的浴缸支脚,其浴缸顶边框由相互对应的左短边及右短边、前长边及后长边组成,前长边及后长边由中间被分为两段,其中间分别设有可使该长边由中间对折叠的边框自锁铰链。本技术缸体软体可以上下厚度折叠外,其缸体顶边框及缸体也可对折,体积更小,易于收纳及携带。



1. 一种便携式折叠熏蒸浴缸, 包括由硬质材料组成的浴缸顶边框(1)、设于浴缸顶边框(1)底边的可折叠软缸体(2)及对称设于浴缸顶边框(1)底边边沿四角的, 可折叠的浴缸支脚(3), 其特征在于, 所述的浴缸顶边框(1)由相互对应的左短边(10)及右短边(11)、前长边(12)及后长边(13)组成, 前长边(12)及后长边(13)由中间被分为两段, 其中间分别设有可使该长边由中间对折叠的边框自锁铰链(4)。

2. 根据权利要求1所述的便携式折叠熏蒸浴缸, 其特征在于, 所述边框自锁铰链(4)包括铰链体(40)及与铰链体(40)配合铰接的, 分别设于前长边(12)的中间被分为两段端头的前左长边铰链端(41)及前右长边铰链端(42), 分别设于后长边(13)的中间被分为两段端头的后左长边铰链端(43)及后右长边铰链端(44); 前左长边铰链端(41)、前右长边铰链端(42)、后左长边铰链端(43)及后右长边铰链端(44), 分别由前左长边铰链环(410)和前左长边铰链导角(411)、前右长边铰链环(420)和前右长边铰链导角(421)、后左长边铰链环(430)和后左长边铰链导角(431)及后右长边铰链环(440)和后右长边铰链导角(441)组成; 铰链体(40)分为铰链体顶段(400)及铰链体底段(401), 在铰链体顶段(400)的两端分别设有左铰链体环(4000)和右铰链体环(4001), 铰链体顶段(400)内侧两端分别设有左铰链体倾斜导角(4002)及右铰链体倾斜导角(4003); 铰链体底段(401)两端的铰链体前底段面(1010)及铰链体后底段面(1011)分别与左铰链体环(4000)和右铰链体环(4001)的环孔中心线的垂直面在同一平面; 铰链体底段(401)与铰链体顶段(400)的结合处的内面, 设有底边与左铰链体环(4000)和右铰链体环(4001)的环孔中心轴线D在同一平面或底边上下与环孔中心线不超过折叠软缸体顶边壁厚三倍距离的折叠软缸体连接槽(402); 在铰链体顶段(400)内, 设有自锁机构(45), 所述自锁机构(45)包括自锁体(450)、与自锁体联为一体的解锁按键(451)、使自锁体(450)回弹的回位弹簧(452)及在前左长边铰链端(41)、前右长边铰链端(42)、后左长边铰链端(43)、后右长边铰链端(44)分别设有当分别分为两段的前长边(12)及分为两段的后长边(13)的两段成水平位置时, 自锁体(450)两端头可卡入的卡口(453); 所述左铰链体倾斜导角(4002)、右铰链体倾斜导角(4003)、前左长边铰链导角(411)、前右长边铰链导角(421)、后左长边铰链导角(431)及后右长边铰链导角(441)的角度为45度—60度之间; 铰链体(40)与前左长边铰链端(41)及前右长边铰链端(42), 铰链体(40)与后左长边铰链端(43)及后右长边铰链端(44), 分别通过铰链轴(46)连接。

3. 根据权利要求2所述的便携式折叠熏蒸浴缸, 其特征在于, 所述当铰链体(40)与前左长边铰链端(41)及前右长边铰链端(42), 铰链体(40)与后左长边铰链端(43)及后右长边铰链端(44), 分别通过铰链轴(46)连接后, 左铰链体倾斜导角(4002)及右铰链体倾斜导角(4003)分别与其相对应的前左长边铰链导角(411)、前右长边铰链导角(421)、后左长边铰链导角(431)及后右长边铰链导角(441)底脚端的距离H小于折叠软缸体顶边壁厚的三倍。

4. 根据权利要求1或2所述的便携式折叠熏蒸浴缸, 其特征在于, 所述可折叠软缸体(2)的底部, 后段及前段分别设有硬质材料制成的后缸底面(20)及前缸底面(21), 后缸底面(20)及前缸底面(21)两者之间为软缸体材料连接。

5. 根据权利要求1或2所述的便携式折叠熏蒸浴缸, 其特征在于, 所述浴缸顶边框(1)的顶部, 设有浴缸盖(5), 该浴缸盖(5)由浴缸前盖(50)、浴缸中盖(51)及浴缸后盖(52)组成; 浴缸前盖(50)与浴缸中盖(51)通过浴缸盖销轴(53)连接; 浴缸后盖(52)设有头孔(520)。

6. 根据权利要求1或2所述的便携式折叠熏蒸浴缸, 其特征在于, 所述浴缸支(脚)3分设

于浴缸顶边框(1)底部的四角,分别由支座(30),与支座(30)通过铰链连接的支腿(31)及分别连接左短边(10)或右短边(11)一侧的两个支腿的支腿横杆(32)组成,由支腿横杆(32)连接的两个支脚,组成一侧支脚;所述横杆(32)向外凸出,呈包覆可折叠软缸体短边状。

7.根据权利要求1或2所述的便携式折叠熏蒸浴缸,其特征在于,所述浴缸顶边框(1)的左短边(10)及右短边(11)上设有便携式折叠熏蒸浴缸折叠后,可将左短边(10)及右短边(11)锁住的提手(7)。

8.根据权利要求1或2所述的便携式折叠熏蒸浴缸,其特征在于,所述可折叠软缸体(2)为二折以上。

9.根据权利要求1或2所述的便携式折叠熏蒸浴缸,其特征在于,所述便携式折叠熏蒸浴缸设有蒸汽加热器(6),在浴缸盖(5)上设有加热管入口(54),蒸汽加热器(6)通过管道与加热管入口(54)配合。

10.根据权利要求1或2所述的便携式折叠熏蒸浴缸,其特征在于,所述可折叠软缸体(2)的底部设有排水口(8)。

便携式折叠熏蒸浴缸

[0001] 技术领域：

[0002] 本实用新型涉及个人洗浴用具浴盆技术领域，特别涉及可折叠，易收纳的折叠浴盆相关技术。

[0003] 背景技术：

[0004] 浴盆是目前人们生活常用的卫生器具，其为了减少占地、易于收纳的目的，便出现了折叠浴盆。可折叠浴盆目前主要有可打开及收纳的支撑架，外套防水材料的折叠浴盆。有由防水材料制成的可充气折叠浴盆。也有由硬质塑料及软塑料材料制成的可折叠浴缸，如中国专利申请号为：“201721174086 .5”，名称为：“一种折叠浴缸”等。对于可打开及收纳的支撑架，外套防水材料的折叠浴盆，存在有使用不安全，无法保持水温温度，使用不舒适，感官不好等的不足。对于可充气折叠浴盆，存在有强度不够，安全性差的不足。对于“一种折叠浴缸”，其结构为浴缸顶部及底部为硬质材料，两者之间为软质材料制成，中间软质材料可以折叠，其四周设有可折叠的支撑腿；该浴缸强度、安全性、感官都不错，也有一定的折叠性，但存在有折叠后体积还是偏大，不易便携及收纳体积大的不足。

[0005] 实用新型技术内容

[0006] 本实用新型的目的是针对以上现有技术的不足，设计一种强度高，使用安全，具有一定的保温效果，感官好的即可沐浴，又可蒸浴，并可多向折叠的便携式折叠桑拿浴盆。

[0007] 本实用新型的目的可以通过以下技术手段实现，一种便携式折叠桑拿浴缸，包括由硬质材料组成的浴缸顶边框1、设于浴缸顶边框1底边的可折叠软缸体2及对称设于浴缸顶边框1底边边沿四角的，可折叠的浴缸支脚3，其所述的浴缸顶边框1由相互对应的左短边10及右短边11、前长边12及后长边13组成，前长边12及后长边13由中间被分为两段，其中间分别设有可使该长边由中间对折叠的边框自锁铰链4。

[0008] 更进一步的，所述的便携式折叠熏蒸浴缸，其边框自锁铰链4包括铰链体40及与铰链体40配合铰接的，分别设于前长边12的中间被分为两段端头的前左长边铰链端41及前右长边铰链端42，分别设于后长边13的中间被分为两段端头的后左长边铰链端43及后右长边铰链端44；前左长边铰链端41、前右长边铰链端42、后左长边铰链端43及后右长边铰链端44，分别由前左长边铰链环410和前左长边铰链导角411、前右长边铰链环420和前右长边铰链导角421、后左长边铰链环430和后左长边铰链导角431及后右长边铰链环440和后右长边铰链导角441组成；铰链体40分为铰链体顶段400及铰链体底段401，在铰链体顶段400的两端分别设有左铰链体环4000和右铰链体环4001，铰链体顶段400内侧两端分别设有左铰链体倾斜导角4002及右铰链体倾斜导角4003；铰链体底段401两端的铰链体前底段面1010及铰链体后底段面1011分别与左铰链体环4000和右铰链体环4001的环孔中心线的垂直面在同一平面；铰链体底段401与铰链体顶段400的结合处的内面，设有底边与左铰链体环4000和右铰链体环4001的环孔中心轴线D在同一平面或底边上下与环孔中心线不超过折叠软缸体顶边壁厚三倍距离的折叠软缸体连接槽402；在铰链体顶段400内，设有自锁机构45，所述自锁机构45包括自锁体450、与自锁体联为一体的解锁按键451、使自锁体450回弹的回位弹簧452及在前左长边铰链端41、前右长边铰链端42、后左长边铰链端43、后右长边铰链端44

分别设有当分别分为两段的前长边12及分为两段的后长边13的两段成水平位置时,自锁体450两端头可卡入的卡口453;所述左铰链体倾斜导角4002、右铰链体倾斜导角4003、前左长边铰链导角411、前右长边铰链导角421、后左长边铰链导角431及后右长边铰链导角441的角度为45度—60度之间;铰链体40与前左长边铰链端41及前右长边铰链端42,铰链体40与后左长边铰链端43及后右长边铰链端44,分别通过铰链轴46连接。

[0009] 更进一步的,所述的便携式折叠薰蒸浴缸,其当铰链体40与前左长边铰链端41及前右长边铰链端42,铰链体40与后左长边铰链端43及后右长边铰链端44,分别通过铰链轴46连接后,左铰链体倾斜导角4002及右铰链体倾斜导角4003分别与其相对应的前左长边铰链导角411、前右长边铰链导角421、后左长边铰链导角431及后右长边铰链导角441底脚端的距离H小于折叠软缸体顶边壁厚的三倍。

[0010] 更进一步的,所述的便携式折叠薰蒸浴缸,其可折叠软缸体2的底部,后段及前段分别设有硬质材料制成的后缸底面20及前缸底面21,后缸底面20及前缸底面21两者之间为软缸体材料连接。

[0011] 更进一步的,所述的便携式折叠薰蒸浴缸,其浴缸顶边框1的顶部,设有浴缸盖5,该浴缸盖5由浴缸前盖50、浴缸中盖51及浴缸后盖52组成;浴缸前盖50与浴缸中盖51通过浴缸盖销轴53连接;浴缸后盖52设有头孔520。

[0012] 更进一步的,所述的便携式折叠薰蒸浴缸,其所述浴缸支脚3分设于浴缸顶边框1底部的四角,分别由支座30,与支座30通过铰链连接的支腿31及分别连接左短边10或右短边11一侧的两个支腿的支腿横杆32组成,由支腿横杆32连接的两个支脚,组成一侧支脚;所述横杆32向外凸出,呈包覆可折叠软缸体短边状。

[0013] 更进一步的,所述的便携式折叠薰蒸浴缸,其浴缸顶边框1的左短边10及右短边11上设有便携式折叠薰蒸浴缸折叠后,可将左短边10及右短边11锁住的提手7。

[0014] 更进一步的,所述的便携式折叠薰蒸浴缸,其可折叠软缸体2为二折以上。

[0015] 更进一步的,所述的便携式折叠薰蒸浴缸,其便携式折叠薰蒸浴缸设有蒸汽加热器6,在浴缸盖5上设有加热管入口54,蒸汽加热器6通过管道与加热管入口54配合。

[0016] 更进一步的,所述的便携式折叠薰蒸浴缸,其可折叠软缸体2的底部设有排水口8。

[0017] 本实用新型的技术进步在于,缸体软体可以上下厚度折叠外,其缸体顶边框及缸体也可对折,体积更小,易于收纳及携带。

附图说明

[0018] 图1为本实用新型缸体打开后的立体结构示意图;

[0019] 图2为本实用新型缸体厚度折叠的立体结构示意图;

[0020] 图3为本实用新型缸体对折的立体结构示意图;

[0021] 图4为本实用新型缸体底部设有硬质材料底面的立体结构示意图;

[0022] 图5为本实用新型图2中的A局部放大立体结构示意图;

[0023] 图6为本实用新型图2中的B局部放大立体结构示意图;

[0024] 图7为本实用新型铰链体的立体结构示意图;

[0025] 图8为本实用新型长边中间被分为两段端头的立体结构示意图;

[0026] 图9为本实用新型铰链体的局部剖视立体结构示意图;

- [0027] 图10为本实用新型铰链体与长边铰链端连接的正面立体结构示意图；
- [0028] 图11为本实用新型铰链体与长边铰链端连接的沿轴线D的垂直剖视结构示意图；
- [0029] 图12为本实用新型图3中的C局部放大立体结构示意图；
- [0030] 图13为本实用新型提手打开的立体结构示意图；
- [0031] 图14为本实用新型浴缸盖的立体结构示意图；
- [0032] 图15为本实用新型与浴缸盖配合的立体结构示意图；
- [0033] 图16为本实用新型软缸体三折的立体结构示意图。

具体实施方式

[0034] 如图1、图2、图3所示，本技术由硬质塑料材料组成的浴缸顶边框1、设于浴缸顶边框1底边的可折叠软缸体2及对称设于浴缸顶边框1底边四角边沿的，可折叠的浴缸支脚3组成。浴缸顶边框1由相互对应的左短边10及右短边11、前长边12及后长边13组成。前长边12由中间被分为两段，分别是前长边左段120及前长边右段121；后长边13由中间被分为两段，分别是后长边左段130及后长边右段131。在前长边左段120、前长边右段121、后长边左段130及后长边右段131的端头，分别设有前左长边铰链端41、前右长边铰链端42、后左长边铰链端43及后右长边铰链端44。铰链体40为结构相同的两个，分别设在前长边12及后长边13被分为两段的中间，分别与左长边铰链端41及前右长边铰链端42，与后左长边铰链端43及后右长边铰链端44组成对称设置的边框自锁铰链4，组成可对折的前长边12及后长边13。本技术中，由中间可对折的前长边12及后长边13为对称设计；分别设于左短边10及右短边11一侧的两个浴缸支脚3及横杆32组成的一侧支脚，对称设计。本申请书中，为了更清楚简要的说明其结构，结合附图的可视面，对其给予详细的描述，对称结构的就不再赘述。

[0035] 由图5、图6、图7、图8、图9、图10、图11所示，其中图5为边框自锁铰链4由外向内看的立体结构示意图，图6为边框自锁铰链4由内向外看的立体结构示意图。铰链体40分为铰链体顶段400及铰链体底段401，在铰链体顶段400的两端分别设有左铰链体环4000和右铰链体环4001。铰链体顶段400内侧两端分别设有左铰链体倾斜导角4002及右铰链体倾斜导角4003。铰链体底段401两端的铰链体前底段面1010及铰链体后底段面1011分别与左铰链体环4000和右铰链体环4001的环孔中心轴线D的垂直面在同一平面。铰链体底段401与铰链体顶段400的结合处的内面，设有底边与左铰链体环4000和右铰链体环4001的环孔中心轴线D在同一平面或底边上下与环孔中心线不超过折叠软缸体顶边壁厚三倍距离的折叠软缸体连接槽402；折叠软缸体连接槽402设在铰链体40上，同样在左短边10、右短边11、前长边12及后长边13的内侧分别设有与402同一水平面的顶边框折叠软缸体连接槽14，用于与可折叠软缸体2的顶部边缘对接。如图9所示，在铰链体顶段400内，设有自锁机构45，自锁机构45包括自锁体450、与自锁体联为一体的解锁按键451、使自锁体450回弹的回位弹簧452及在前左长边铰链端41、前右长边铰链端42、后左长边铰链端43、后右长边铰链端44上分别设有当分别分为两段的前长边12及分为两段的后长边13的两段成水平位置时，自锁体450两端头可卡入的卡口453；铰链体顶段400外侧面，设有与解锁按键451配合的按键孔4004，供解锁按键451穿出。

[0036] 铰链体40上所设的左铰链体倾斜导角4002、右铰链体倾斜导角4003及左长边铰链端41、前右长边铰链端42、后左长边铰链端43、后右长边铰链端44上分别所设的左长边铰链

导角411、前右长边铰链导角421、后左长边铰链导角431及后右长边铰链导角441的倾斜角度 α 为45度—60度之间。为了使可折叠软缸体2与浴缸顶边框1底部连接处易于折叠,所述铰链体40与前左长边铰链端41及前右长边铰链端42,铰链体40与后左长边铰链端43及后右长边铰链端44,分别通过铰链轴46连接后,左铰链体倾斜导角4002及右铰链体倾斜导角4003分别与其相对应的前左长边铰链导角411、前右长边铰链导角421、后左长边铰链导角431及后右长边铰链导角441底脚端之间设有一定的距离H,所述的距离H大于零,小于折叠软缸体顶边壁厚的三倍。

[0037] 铰链体40与前长边12的连接,是分别通过设于铰链体40上的左铰链体环4000和右铰链体环4001与前左长边铰链端41及前右长边铰链端42分别通过两个铰链轴46实现。铰链体40与后长边13的连接,是分别通过设于另一铰链体40上的左铰链体环4000和右铰链体环4001与后左长边铰链端43及后右长边铰链端44,分别通过另两个铰链轴46实现。

[0038] 本技术为了易于折叠、较长时间保持浴缸内的水的温度及洗浴时防滑舒适,所述可折叠软缸体2的底部,后段及前段分别设有硬质材料制成的后缸底面20及前缸底面21,后缸底面20及前缸底面21两者之间为软缸体材料连接。后缸底面20可以抬高设计,其上设置防滑凸纹或设置防滑硅胶垫。前缸底面21设置防滑纹路面或防滑硅胶层。后缸底面20及前缸底面21可以仅设在可折叠软缸体2的底部,也可设置成既有底部,又其边沿延伸至可折叠软缸体2的底部侧边边沿,如图4所示。

[0039] 本技术如图14、图15所示,在所述浴缸顶边框1的顶部,设有浴缸盖5,该浴缸盖5由浴缸前盖50、浴缸中盖51及浴缸后盖52组成。浴缸前盖50、浴缸中盖51及浴缸后盖52可与浴缸顶边框1的顶部内侧或外侧或内外侧卡接。为了方便折叠收纳,所述浴缸前盖50与浴缸中盖51通过浴缸盖销轴53连接。在浴缸后盖52设有头孔520。在浴缸前盖50上设有加热管入口54通过蒸汽管道60与独立设置的蒸汽加热器6配合连接,实现桑拿或熏蒸。

[0040] 本实用新型所述的提手7的具体结构为,在所述浴缸顶边框1的左短边10上设有提手锁键孔100,在右短边11上设有提手铰链座110及头枕111;在提手7的一端70通过铰链设置在提手铰链座110上,提手7的另一端设有可卡入提手锁键孔100的锁钩71。

[0041] 本实用新型,也可在折叠浴缸支脚3的铰链结构上,设置当支座30与支腿31折叠后或支开后的卡接件,以达到折叠浴缸支脚3打开时的稳定及折叠时的不易松动打开。

[0042] 所述可折叠软缸体2的底部设有带有开关结构的排水口8,用于洗浴后的排水。

[0043] 如图16所示,所述可折叠软缸体2为三折的,折叠时的结构示意图。

[0044] 本实用新型的使用为:其收纳时,由排水口8排尽浴缸内的水,将所述由浴缸盖销轴53连接的浴缸前盖50与浴缸中盖51对折,使浴缸前盖50卡设在浴缸顶边框1的左段顶部,使浴缸后盖52卡设在浴缸顶边框1的右段顶部,用左右手分别同时向内按压分别设于前长边12及后长边13中间的铰链体40上的解锁按键451,使自锁体450的两端向内移动,分别脱离设于前左长边铰链端41及前右长边铰链端42上的卡口453;分别脱离设于后左长边铰链端43及后右长边铰链端44上的卡口453,并同时向下按压分别设于前长边12及后长边13中间的铰链体40,使前长边12及后长边13对折,再分别按压分别设于左短边10及右短边11侧的一侧支脚,使支腿横杆32包覆住折叠软缸体短边,用力按压,使前长边12及后长边13分别对折后的两段相互靠近,将锁钩71对准提手锁键孔100卡入,松开对折后的两段相互靠近的压力,锁钩71卡入提手锁键孔100即可。

[0045] 洗浴使用时,向内按压对折后的两段,使其相互靠近,拉动提手7,使锁钩71由提手锁键孔100内脱离,拉开分别包覆住折叠软缸体短边的一侧支脚,使前长边12及后长边13由对折向水平移动,移动到水平位置时,在分别设于前长边12及后长边13 中间的铰链体40中,回位弹簧452的作用下,自锁体450的两端向外移动,分别卡入设于前左长边铰链端41及前右长边铰链端42上的卡口453;分别卡入设于后左长边铰链端43及后右长边铰链端44上的卡口453内,将热水放入浴缸,使用即可。

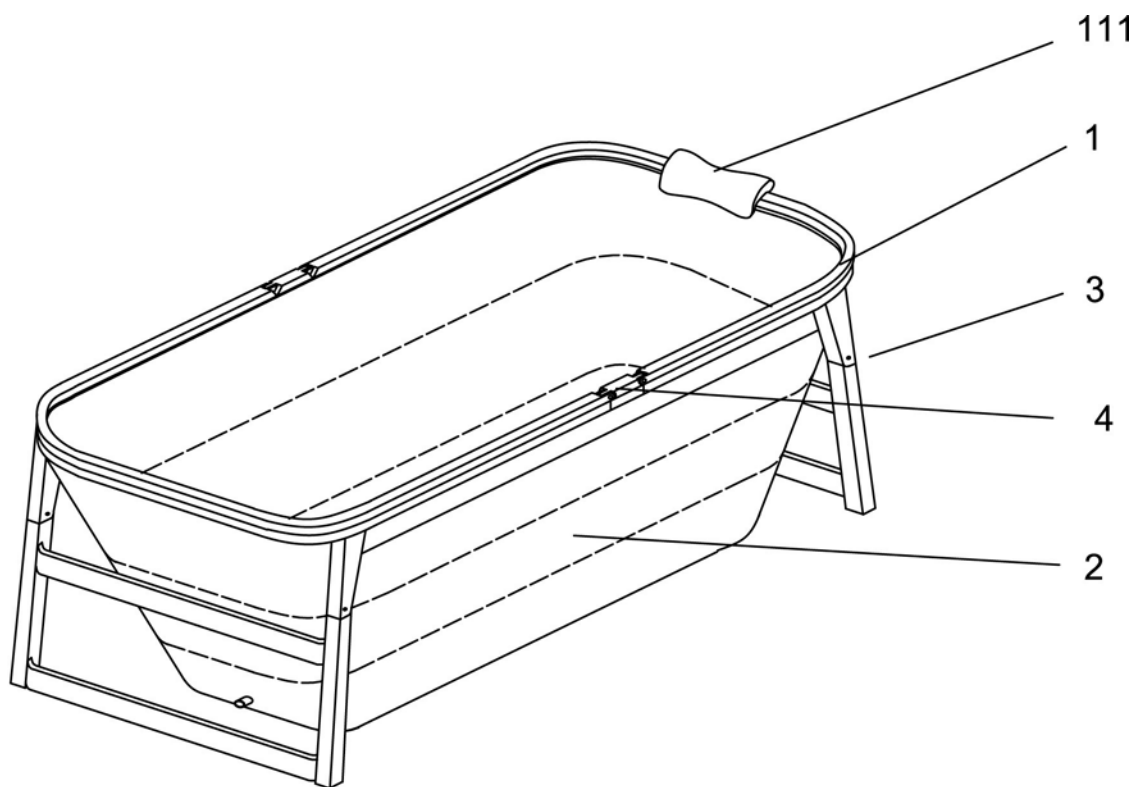


图1

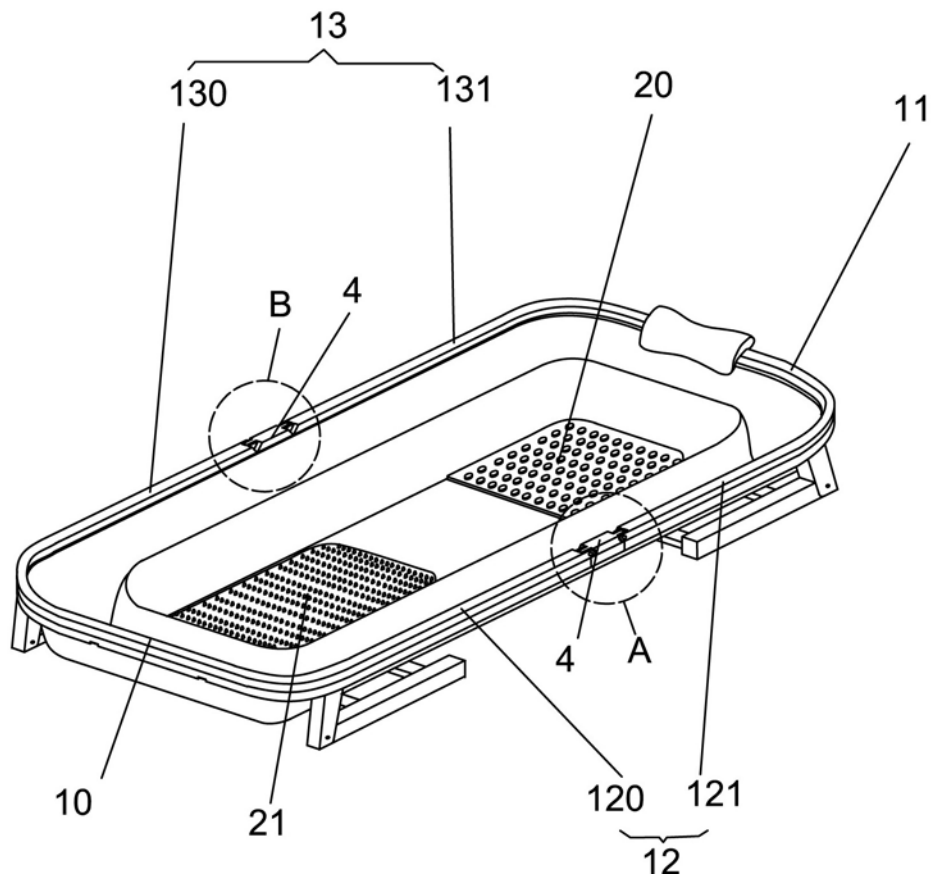


图2

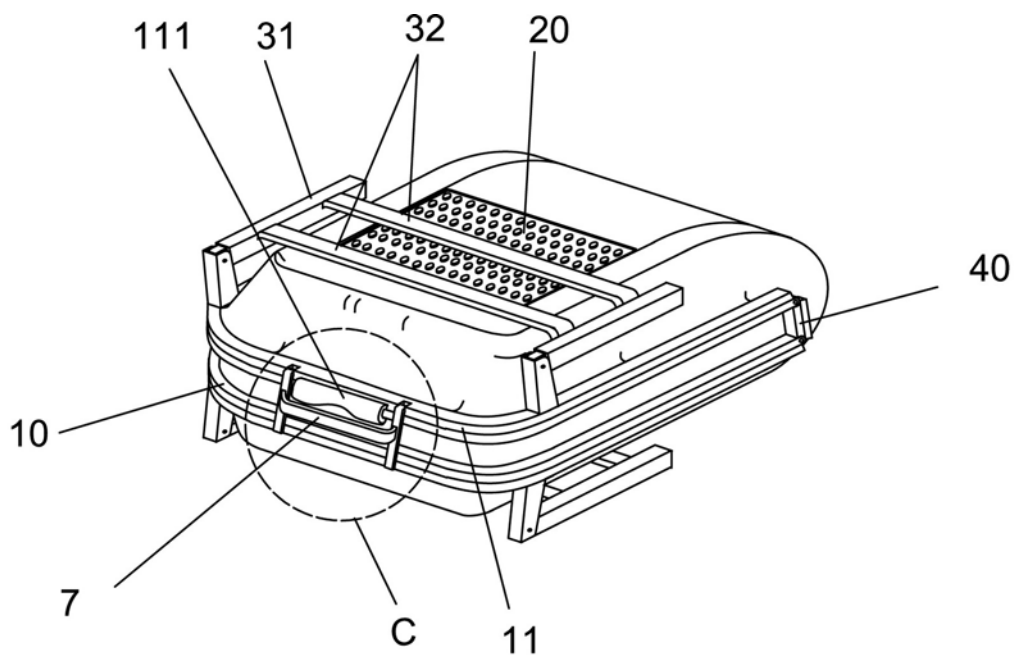


图3

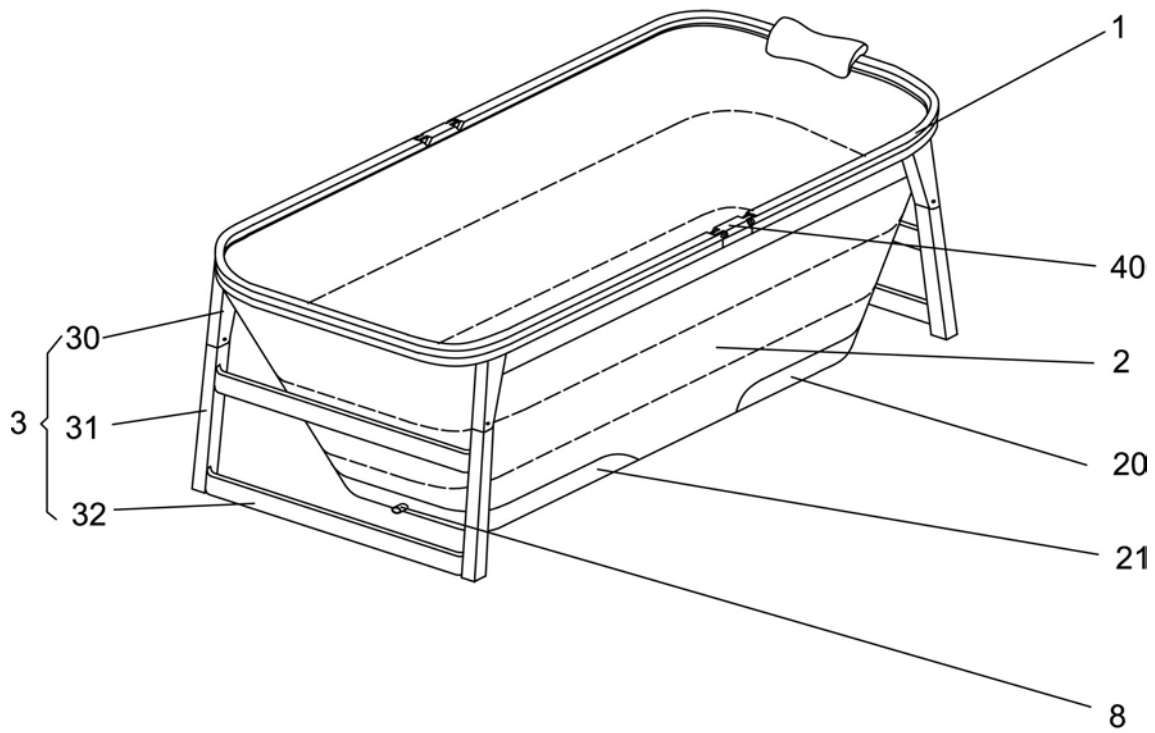


图4

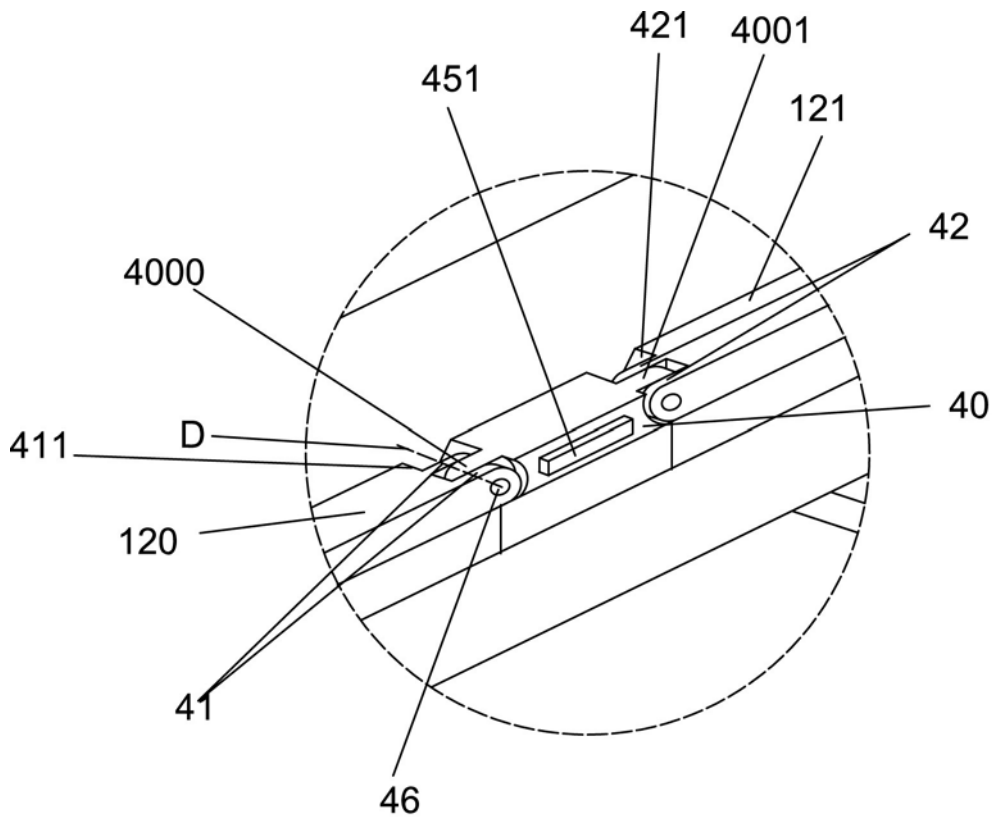


图5

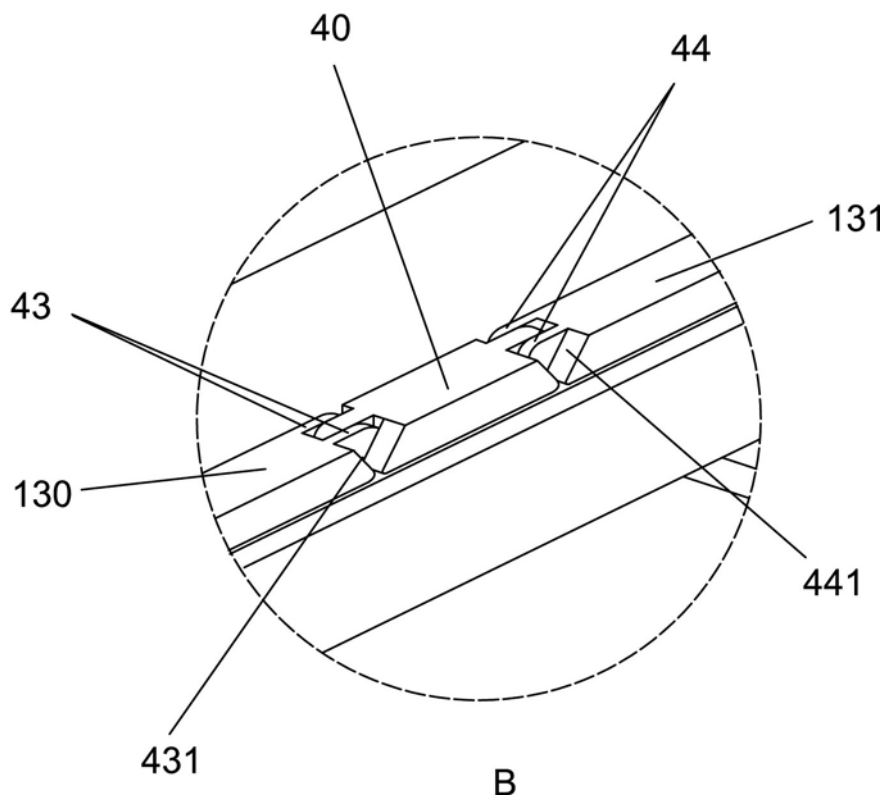


图6

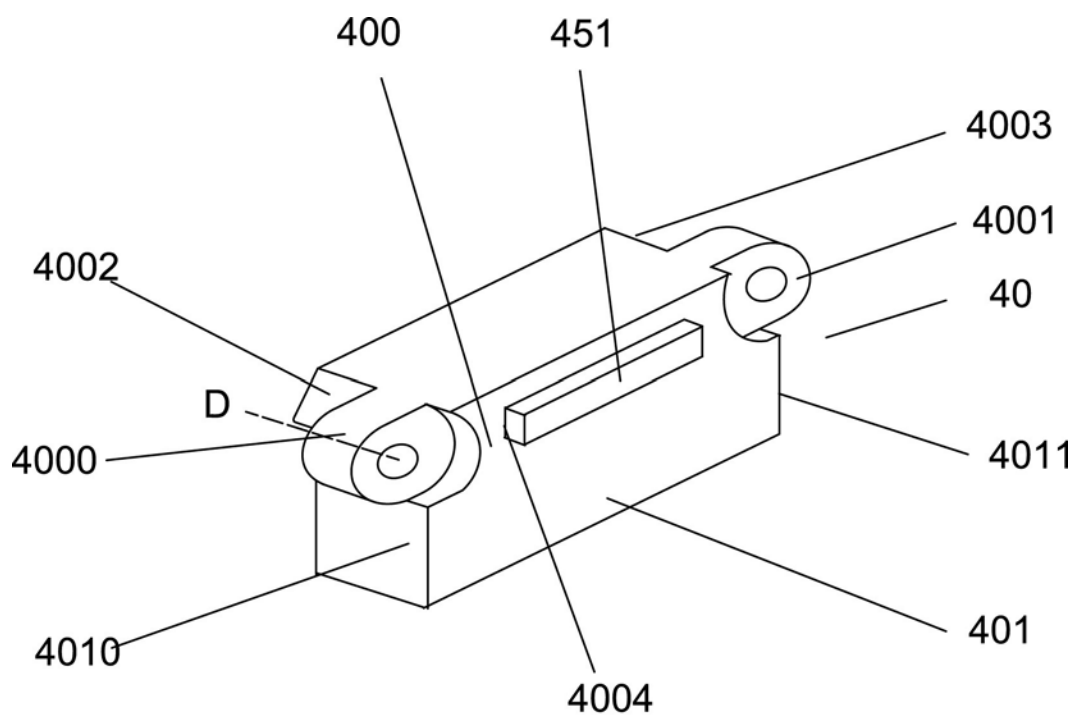


图7

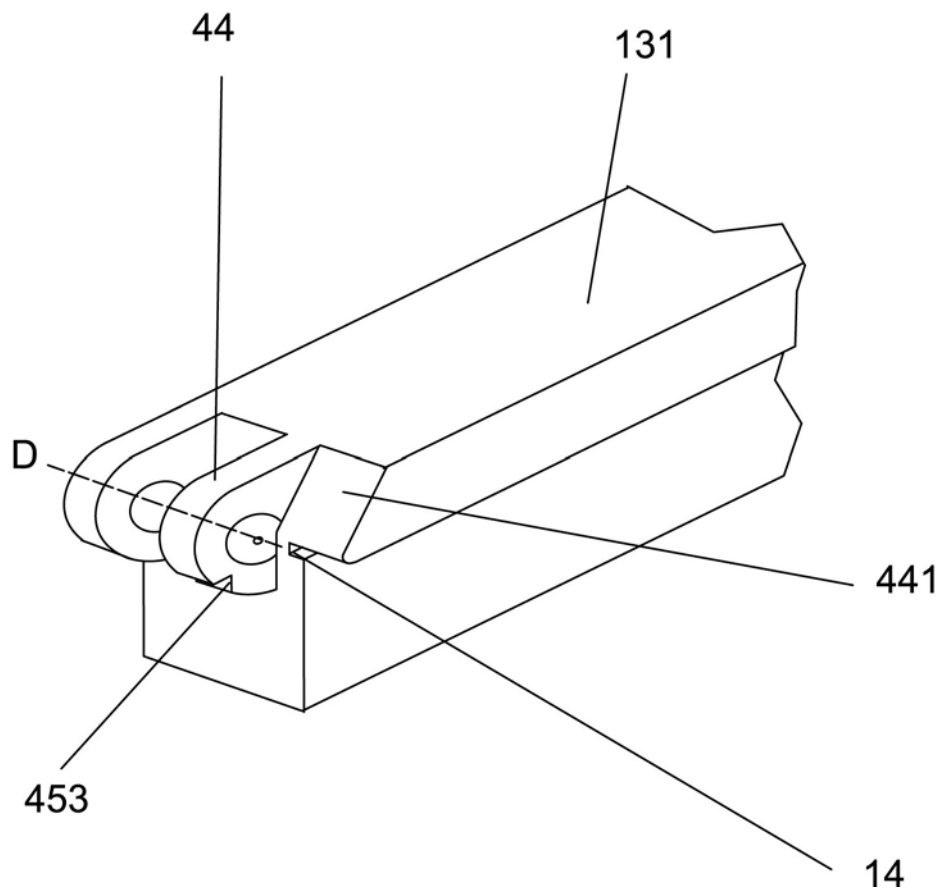


图8

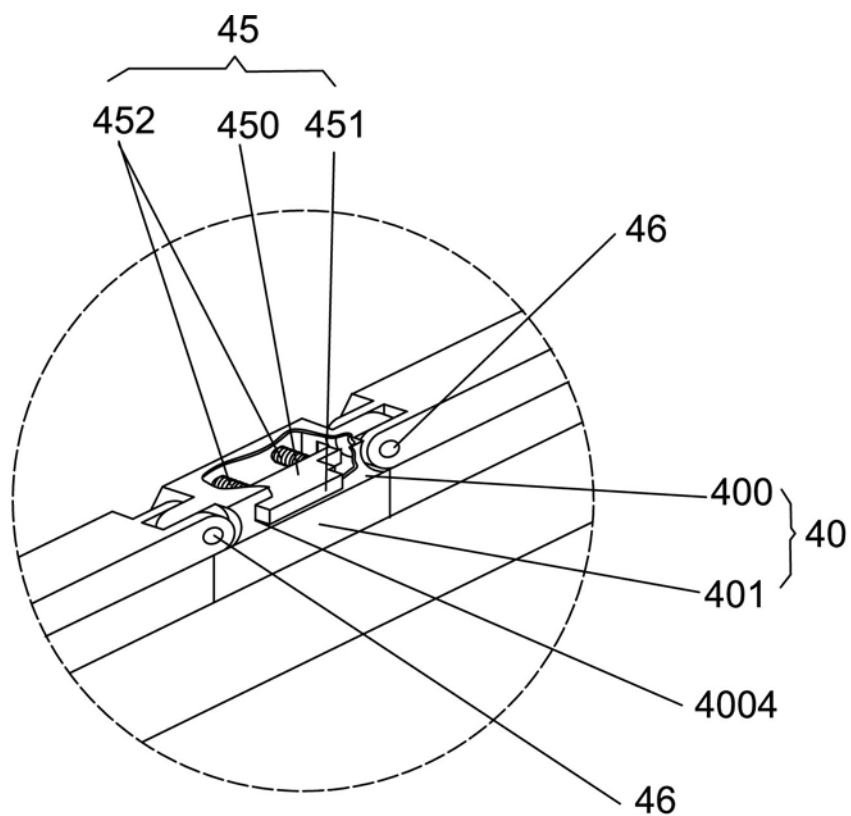


图9

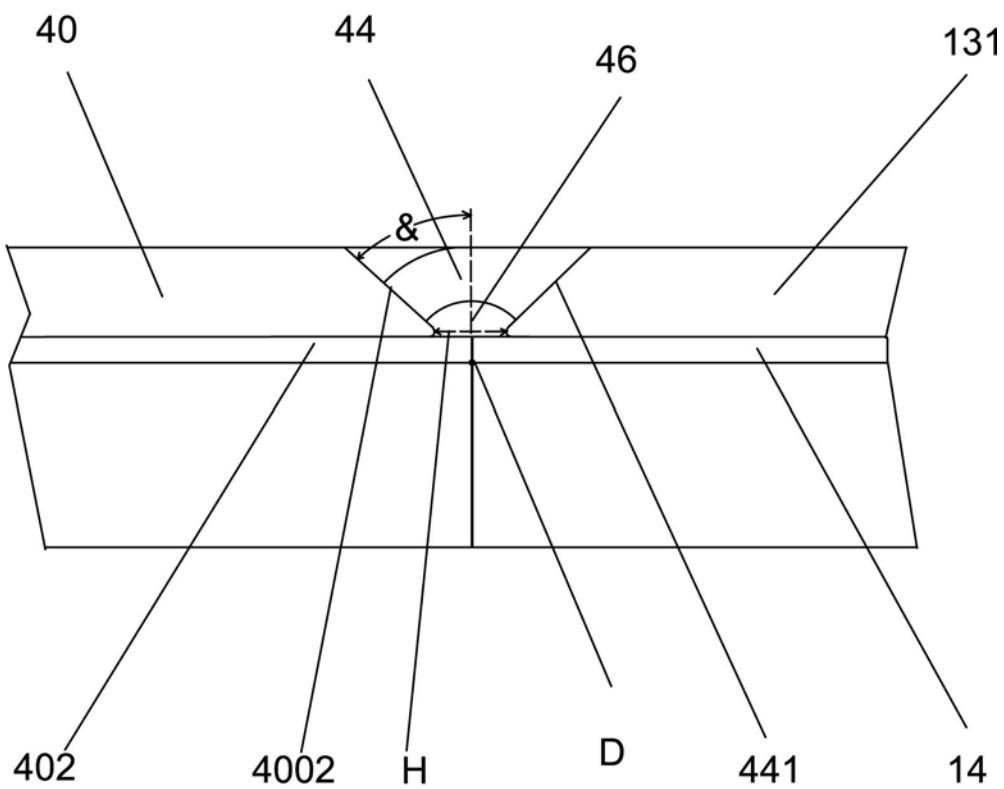


图10

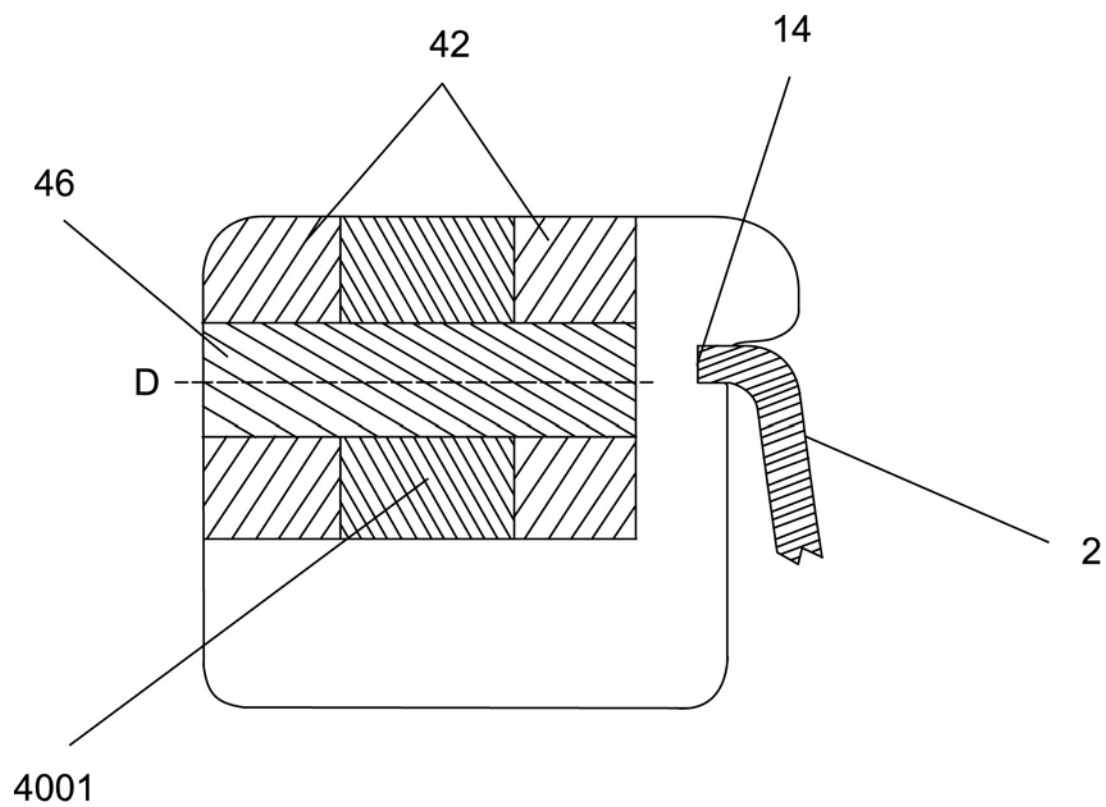


图11

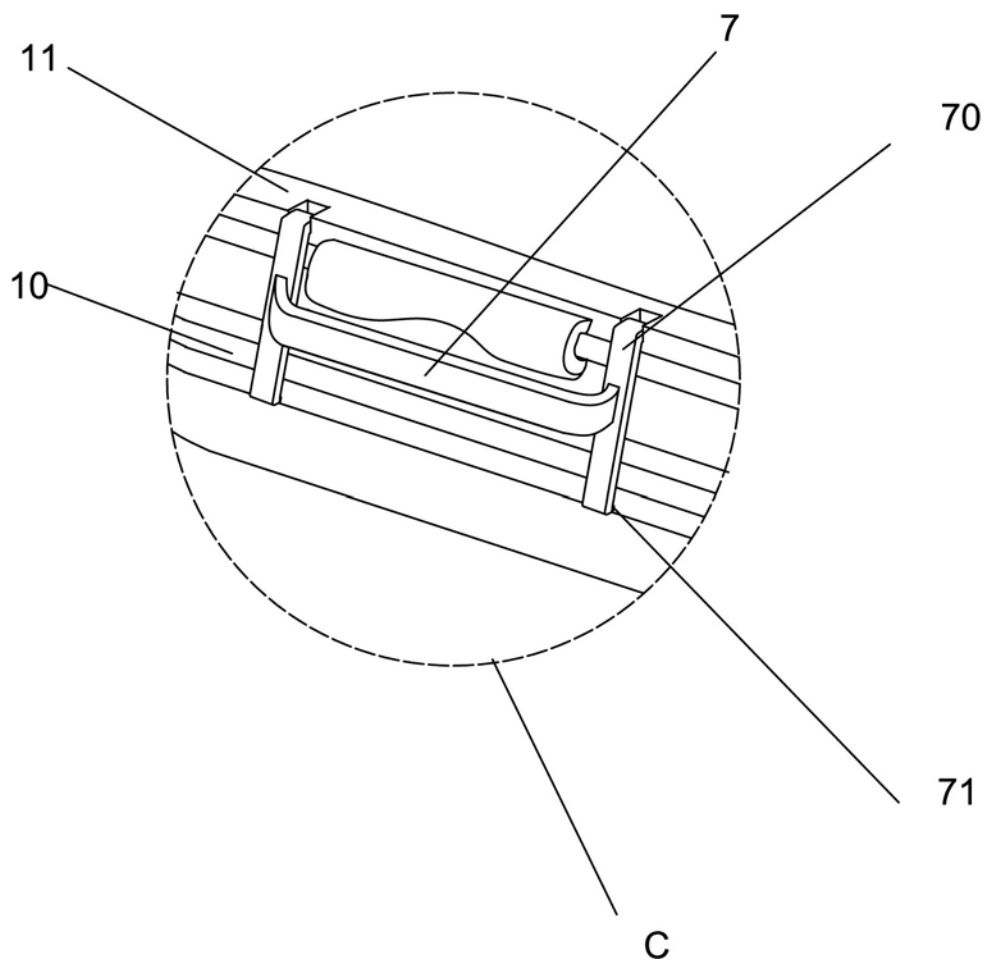


图12

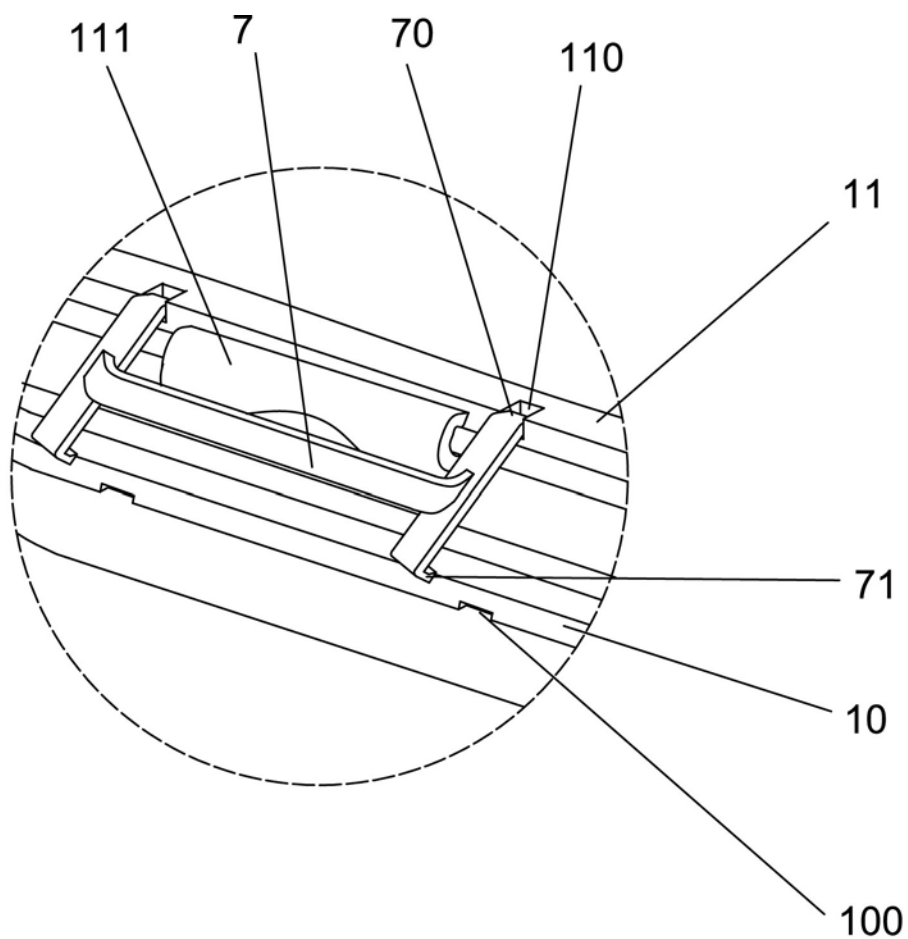


图13

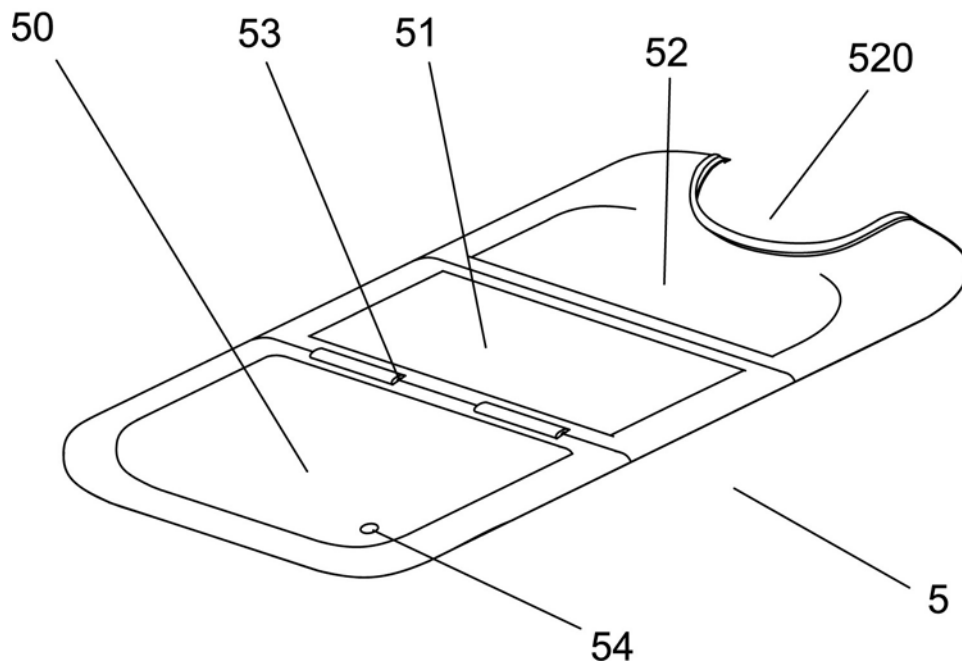


图14

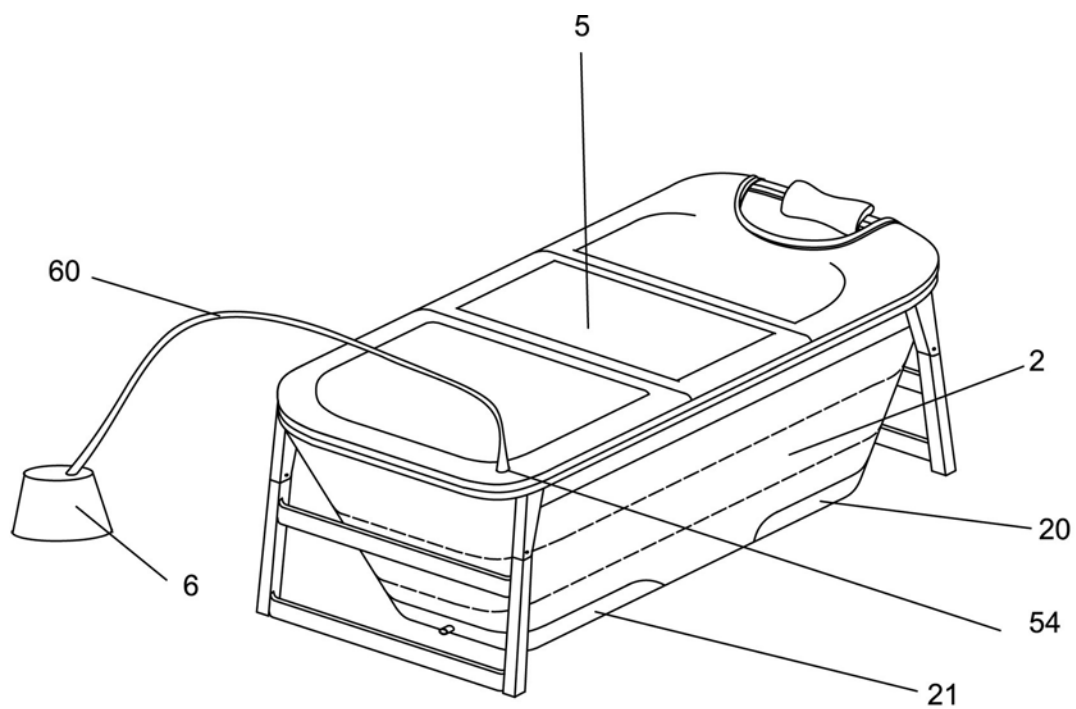


图15

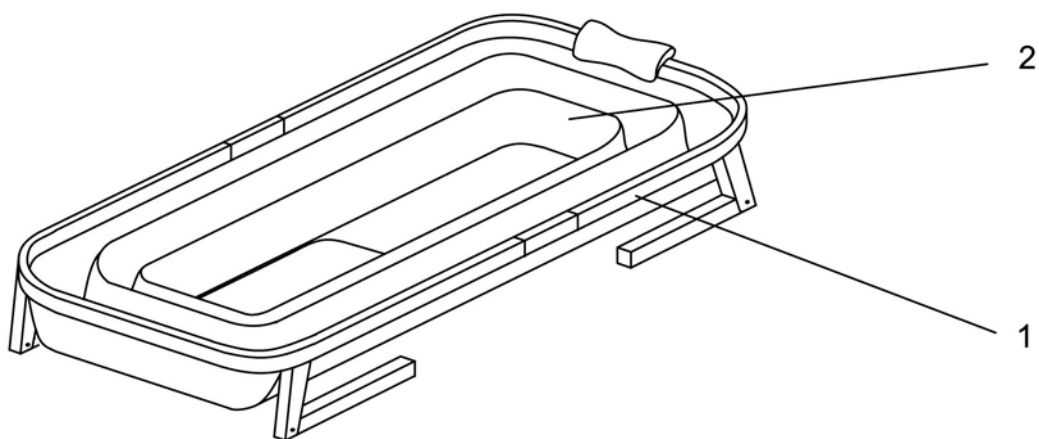


图16